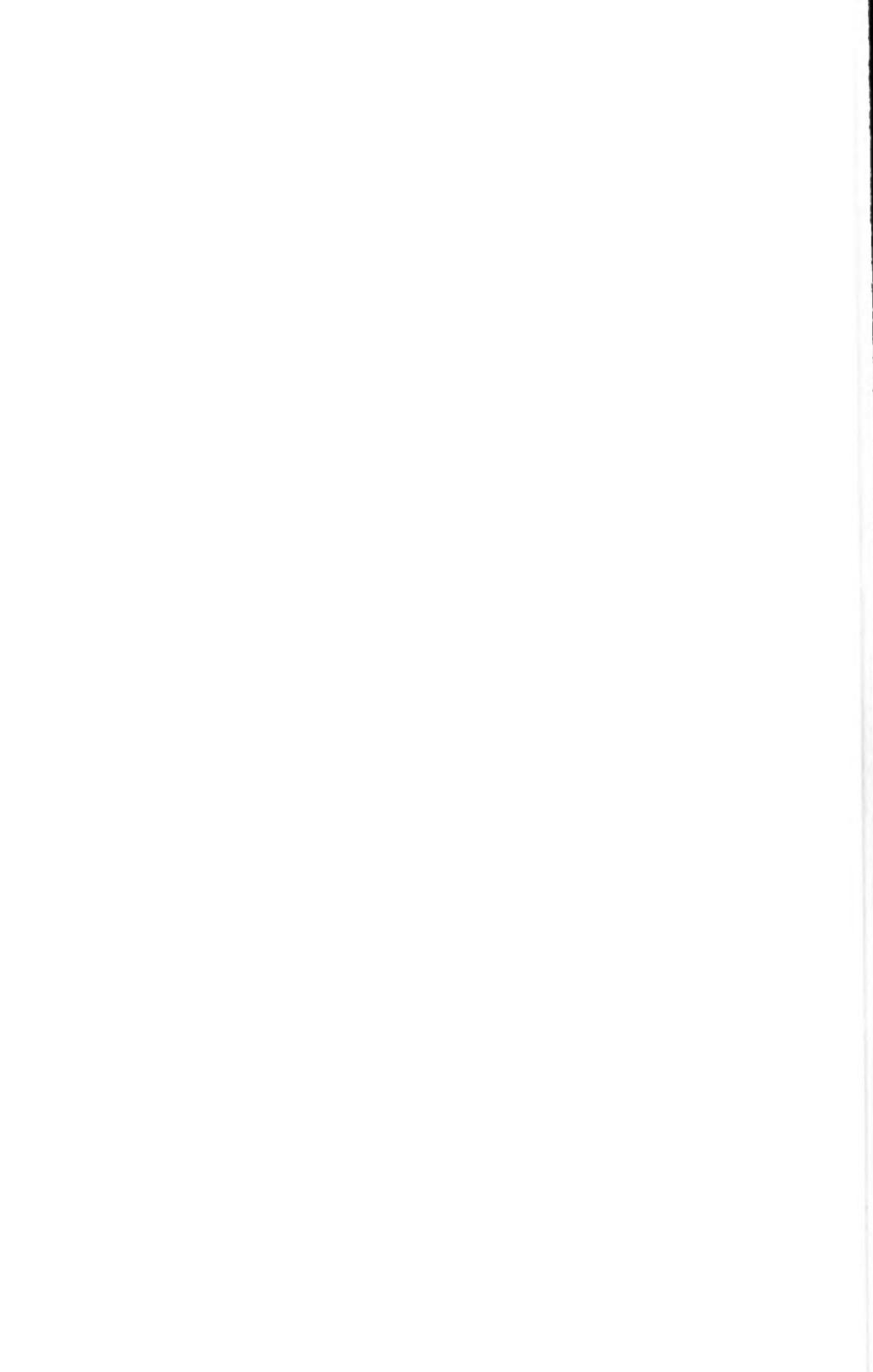


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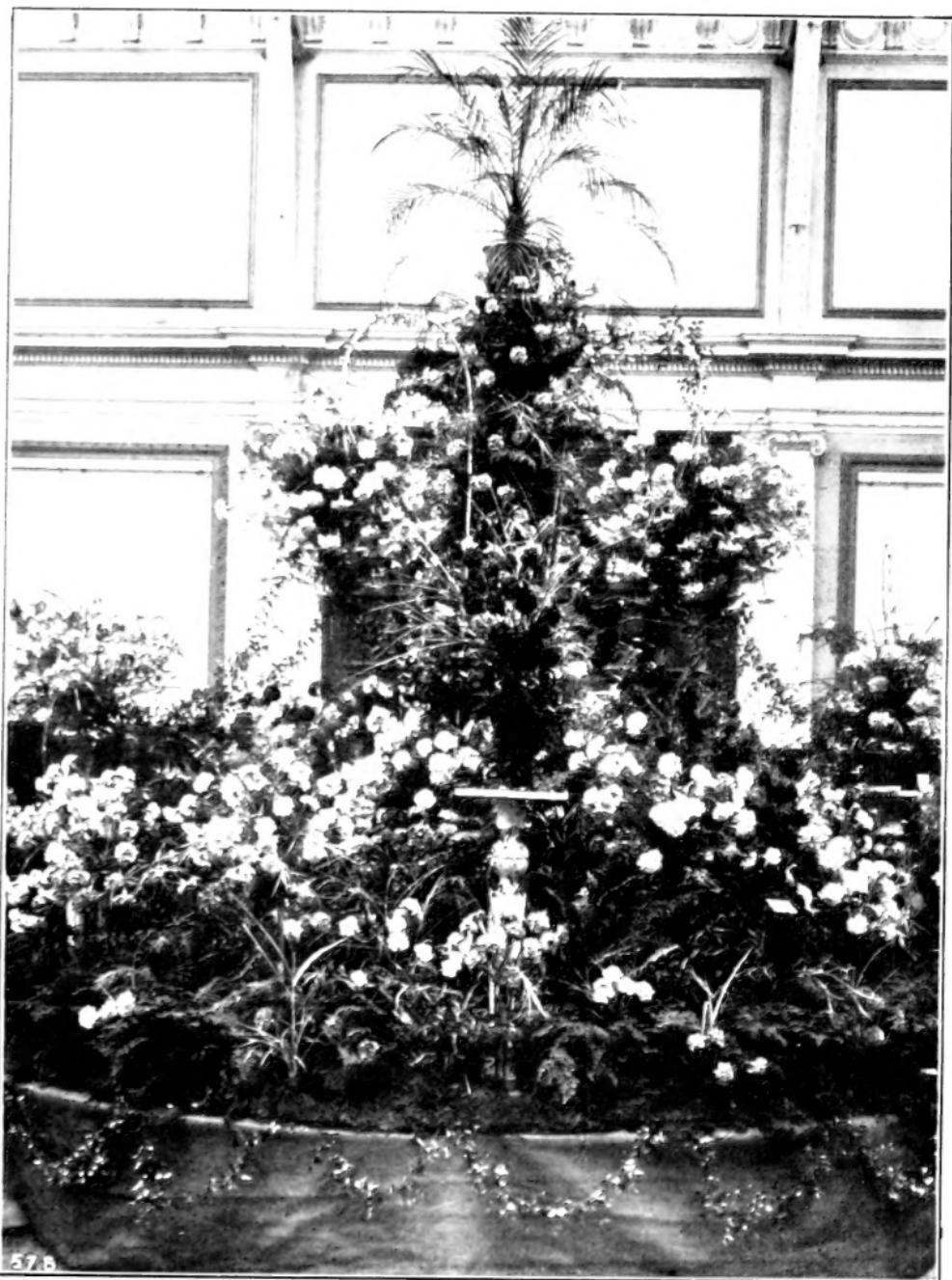
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An Attractive Group of Perpetual Flowering Carnations.

PERPETUAL CARNATIONS

A Complete Manual, with
all Details of Cultivation

By

LAURENCE J. COOK, F.R.H.S.

Hon. Treasurer of the Perpetual Flowering
Carnation Society

*With Sixteen Full-page Plates
from Photographs*

CASSELL AND COMPANY, LTD
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PREFACE

THE growers of Perpetual Flowering Carnations and devotees of the flower have so increased during the last few years, that I feel the production of this little work to be no superfluous effort.

Books on this subject published in America are liable to be misleading to growers in this country, for the reason that the conditions are so different in our climate, with its dull, sunless days.

I freely admit that the knowledge of how to grow Carnations has extended almost as rapidly as cultivators have increased, and the art is no longer looked upon as a mystery known only to the few. Many things are "so easy when one knows how," and the cultivation of the premier winter flowering plant is no exception. Some people are "born cultivators," and are able to grow anything, yet others are just the reverse; to such, and those who would have better plants than they have had in the past, I commend the hints and rules given in these pages, with the earnest hope that they may be of service.

LAURENCE J. COOK.

ROYAL NURSERIES,
BUSH HILL PARK, MIDDLESEX.



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PERPETUAL CARNATIONS

CHAPTER I

THE PAST AND FUTURE OF PERPETUAL CARNATIONS

IF I could record by an illustration the expression on the faces of those Carnation "experts" of fifteen years ago as they gazed on the first American Carnation, and contrast this with the enraptured look one sees at the flower shows of to-day, the picture would not be the least interesting in this little book. On the one side we have distrustful criticism—almost contempt; on the other delight, admiration—almost adoration. Not that the early varieties of the flower lacked beauty, but simply that they were the very opposite to what a connoisseur considered they should be.

Truly the American or, as we now more correctly term it, the Perpetual Flowering Carnation has made wonderful strides, both in habit of growth and form of flower.

It is unnecessary to go into the full history of the Perpetual Flowering Carnation, but a glance at its antecedents should save many a mistake in its cultivation. When we know that the Carnation is a

PERPETUAL CARNATIONS

Dianthus, it should become firmly impressed on our minds that we are dealing with a hardy plant, and hardy plants for successful cultivation under glass require at all times the maximum amount of air and sun that can be afforded them. I once saw a man growing Perpetual Flowering Carnations with maidenhair ferns! It sounds absurd, and is so. It shows a lack of intelligence one does not expect to find in a cultivator of such a lovely flower, but had our friend known that he was dealing with a Dianthus he surely would not have made such an error. Let us, then, glance at the forerunners of the Perpetual Flowering Carnation of the present day.

The plant owes its first development to the French, and its great improvement in habit of growth to the Americans; all that we Britishers can claim in connection with it is the development of new shades of colour. While the Americans rightly commenced with the habit of growth as the basis of their experiments, we neglected vigour of growth for fine form of bloom, little knowing that in so doing we were "off the line"; for in a winter blooming plant especially, we must secure good growth before colour and form of flower, otherwise the plants will lack sufficient vigour and perpetual flowering qualities to produce blooms in the dead of winter. To the French, then, fall the first honours in the development of the Perpetual Carnation, although they too wandered from the right path, with the result that to-day their typical "Remontant" type is probably but little

THEIR PAST AND FUTURE

superior to that which they already possessed half a century ago.

Until recently blooms of these Remontant Carnations were imported in great quantities each spring into this country from France; but in consequence of the regular home supply, at reasonable prices, of the up-to-date Perpetual varieties, fewer blooms arrive each year. One can easily see the family resemblance between some of these blooms and the popular Enchantress of to-day. From France the Remontant Carnations were imported into America about 1852, and the enterprising nurserymen of that country immediately commenced to improve the race, although, so far as we know, no startling improvements appeared for many years. My acquaintance with the first American Carnation only extends back some fifteen years, when I became infected with love and enthusiasm for this flower from the late Mr. E. F. Hopper, whose quiet work and unassuming, modest manner debarred him from becoming well known, but whose knowledge of Carnations was excelled by few men in his day. I am glad of the opportunity of paying a tribute to this excellent grower, whom some people in the horticultural world may remember at Bush Hill Park. My first impression of the American Carnation is very vivid; the flower suggested the Marguerite Carnation one obtains from seed to-day. I fancy this variety was Daybreak, but we had several of them, including the then celebrated Lizzie McGowan.

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Shortly after 1897 the famous Mrs. T. W. Lawson appeared on the scene; at that time the report that the stock of this variety had been sold for \$30,000 was treated as a fairy tale, although we have since realised that it was well worth it; and when Messrs. Hugh Low and Co. were the first to be honoured by the Floral Committee of the Royal Horticultural Society, with the "Award of Merit" for this Perpetual Flowering Carnation of the American type, many people thought that committee lacked both taste and judgment. That the committee was right on this occasion history has proved. Shortly afterwards Governor Roosevelt made its bow, and I well remember what a "find" we thought this fimbriated crimson to be.

The return flight to Europe of the Perpetual Flowering Carnation was made to England, and I venture to think that Mr. A. Smith, the raiser on this side of the Atlantic of the first great Perpetual Carnation, aptly named "Britannia," has done as much as anyone to popularise the new race in Europe, for in Britannia we have a variety which combines freedom of habit—the most important quality—with colour and form. Indeed, Britannia has the qualities of the British and American varieties. We all like to grow it on account not only of its beautiful flowers, but because it makes such a handsome plant.

The future of the Perpetual Flowering Carnation is no speculation—it is assured. To hold up a bunch of Carnations and study their beauty is to revel in one of

THEIR PAST AND FUTURE

the most lovely creations of Nature and the gardener. To inhale their delicious perfume is in itself a great delight. Now that the flowers may be obtained at reasonable prices all the year round, they become an item of necessity for the decoration of rooms. What man, the Creator's agent, will in the future do for the Perpetual Flowering Carnation history alone will show, but so long as gardens last the Perpetual Carnation will be one of our most treasured flowers.

CHAPTER II

HOW PERPETUAL CARNATIONS ARE INCREASED

PROPAGATION can be effected in two ways: from cuttings (the correct way) and by layers. We propagate from cuttings because the operation is carried out in the early part of the year, and gives ample time to build up a good plant that will commence to bloom in the autumn. Should we resort to the system used in propagating Border Carnations—by layers in summer—there is not sufficient time to form a fine bushy plant with several flower shoots. I will therefore deal only with cuttings.

One of the chief difficulties in writing a technical book is to avoid becoming too technical, for while the professional grower may dip into this book for reference and hints, the amateur will treat it as a handbook and guide. Although I could express myself in a few words to the professional grower, they might be liable to be misunderstood by, or be not wholly intelligible to, an amateur. A beginner recently asked me what was meant by "stopping" a Carnation! Please, therefore, bear with me, expert reader, if I am thought to be too verbose in my explanations.

The Right Sort of Cutting.—The first step in propagating is to take the correct cutting. This is



Fig. 1.—Side Growth Suitable for a Cutting (see page 7).



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not found at the top of the flower shoot, for such a cutting produces a small plant which immediately produces thin, flowering growths. Neither is the right cutting found at the base of the plant, for this cutting produces a woody, and not at all a free flowering plant. The ideal cutting is found midway between the flower bud and base of the shoot which has already bloomed or is about to bloom. I can best show this by an illustration (see Fig. 1). Here it will be seen that a side or lateral growth, about 3 or 4 inches long, springs from the main shoot. This may be detached by being held firmly at the base and giving a sharp pull sideways and down, when the entire piece should come away with a hard base known as a "heel" Fig. 2 (A). The cutting should be trimmed by removing the bottom leaves, and if the "heel" is hard and woody this should be severed with a sharp knife and the small scaly leaves removed, as in Fig. 2 (B). The cutting is ready to "pot off," as shown in Fig. 2 (C).

Those who take cuttings in November have a difficulty in finding the correct sort of growth. Unless old stock plants are kept for the purpose of supplying cuttings, with many varieties the only cuttings available in late autumn are the tops of the growths of the plant, all of which, if allowed to remain on the plant, would produce blooms. Hence we should have a cutting which, as a young plant, would soon develop into a flowering shoot—an unsatisfactory basis on which to build up a good plant. It will be seen

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at once that by taking the wrong cutting one not only has an unsatisfactory plant, but also robs oneself of a flower which in due course would undoubtedly have formed had the shoot remained on the plant.

Avoid taking cuttings from either weak or sickly plants, just as you would avoid taking them from plants which are either very hard or wiry, or soft and sappy. To take cuttings from diseased or unhealthy plants is to propagate disease and cause trouble; and if no suitable cuttings are to be had, my advice is to take none at all, for poor cuttings make poor plants, and poor plants neither pay nor give satisfaction. If it is not possible to propagate from good stock plants, it is not only far more economical to buy young ones, but the only wise policy. Young, rooted plants in small pots may always be obtained very reasonably from any nurseryman who has a reputation to lose; but the purchaser of these should use the utmost care, as there are always very cheap "surplus" lots to be had, propagated from "anything and everything," and dear at any price in the end.

I will describe three methods of striking cuttings—*(a)* for those who only require to strike a few plants; *(b)* for those who need a fair number, say several hundreds; *(c)* for those who require large numbers—the method employed in the nurseries at Bush Hill Park, where the cuttings of each sort are put in by the thousand.

I will describe two methods, suited to those who wish only to strike a few cuttings *(a)*.

HOW THEY ARE INCREASED

The Best System for Amateurs.—(1) Half fill a 5-inch or 6-inch pot with crocks; then fill up with clean, sharp sand, which I advocate in preference to the mixture of equal portions of sifted loam, leaf mould, and sand employed by some. I prefer sand, as, if clean, it contains no impurities, neither is there risk of the sand becoming sour as when a mixture of loam, leaf mould, and sand is employed, and for the same reason the use of peat is still less desirable. To those of the old school who say there is no goodness in sand, I reply I do not grow my cuttings in it, but pot them as soon as the roots are $\frac{1}{2}$ inch long. Dibble the cuttings in $1\frac{1}{2}$ inches apart, $\frac{1}{2}$ inch deep; make firm and thoroughly water in, so that during the period taken to root—which with most varieties is usually three to four weeks—probably no further watering will be necessary. Place the pot of cuttings in a propagating box where the temperature of the bench on which the pot rests is maintained at an even temperature of 55° Fahrenheit. The temperature in the box should on no account exceed 60° . Shade the propagating box from direct rays of sunshine and keep closed for two weeks until the cuttings are callused and signs of roots appear. As soon as these rootlets appear, allow the propagating boxes to remain open an hour or two night and morning, and in the course of a further few days, as the majority become rooted, the young plants must be hardened off and the boxes left open entirely, only covering to shade from the

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sun. The young cuttings should be potted in 2-inch pots as soon as the roots are $\frac{1}{2}$ inch long. (See Fig. 2 (c)).

(2) Supposing that no propagating box is available, another similar system would be to place plenty of crocks at the bottom of an 8-inch or 10-inch pot, half fill with sand, leaving a distance of 5 inches to the top of the pot. Dibble the cuttings in $1\frac{1}{2}$ inches apart, $\frac{1}{2}$ inch deep. Thoroughly water the cuttings in and cover the top of the pot with a piece of glass. A position should then be selected on a hot-water pipe where the temperature of the soil in the flower-pot will not rise above 55° . A brick might be placed between the pot containing the cuttings and a *return* hot-water pipe, which should run no risk of becoming too hot. For greater safety, however, the pot containing the cuttings might be plunged in a box of soil and then stood upon the hot-water pipe, and in any case the worker should thoroughly test with a thermometer the temperature of a pot of sand stood upon the pipe as suggested. To allow the warmth of the pot to mount higher than 60° incurs the risk of spoiling the cuttings, or at least of starting a premature and forced growth which is very detrimental to the subsequent life of the young plant. Although continual watering of cuttings should be avoided as far as possible, no risk should be run of allowing them to become dry, for once this happens the chances of rooting are remote.

Whichever of these two processes be selected, the subsequent treatment is the same. Remove the



Fig. 2.—A Suitable Cutting and its Development (see Fig. 7).



HOW THEY ARE INCREASED

glass from the pots or propagating frame for an hour or two daily, after about the second week, when the cuttings are callused—i.e. about to emit rootlets. The idea is to harden them off so that when ready for the first potting, which should be at the end of the fourth or fifth week, sturdy, hardy little plants are ready for their first step in life.

I now come to system (b), referred to on page 8, which would suit those wishing to raise a hundred or two hundred plants annually, yet who have not a propagating pit or box to spare. It is very similar to that just described. Take a box 8 or 9 inches deep, half fill with clean sand, make firm, and put in cuttings $\frac{1}{2}$ inch deep, $1\frac{1}{2}$ inches apart, in rows 2 or 3 inches apart. Thoroughly water in, cover with glass, and treat the same as in the previous case, never allowing a draught or direct rays of the sun to wilt or wither the cuttings, for wilted cuttings, even if one succeeds in rooting them, make hard, wiry plants which in due course cause disappointment. Place this box over hot-water pipes which can be controlled so as never to give greater heat in the sand than 60° . Some advocate a lower temperature than this, and the propagator must watch that the temperature is rather under than over this degree. Remove the glass as soon as possible to obtain hardy little plants.

How Large Numbers of Cuttings are Rooted.

—We now come to the most practical system (c), mentioned on page 8, which gives maximum results with a minimum of labour employed. A frame is

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made with back and front 8 or 9 inches deep; a centre bar, to form a roof $1\frac{1}{2}$ to 2 feet high, runs the length of the frame to carry loose panes of glass, the whole forming a small glass case-like structure, which is placed directly on the bench. The bench should be composed of slates, tiles, or, better still, bricks, as these retain moisture, and tend to prevent the contents of the frame from drying out. Wooden benches are not suitable, as they are liable to create fungoid growth, and encourage the spread of disease. This frame is filled with sand to a depth of 3 or 4 inches, made firm, and watered.

The cuttings are placed in the sand, approximately $\frac{1}{2}$ inch deep. A board is laid on the surface and a deep line, about $\frac{1}{2}$ inch in depth, is drawn across the sand by means of the pointed end of a 5-inch label or a blunt knife, holding the board firmly on the sand and using it as a ruler; we then have a sort of furrow, $\frac{1}{2}$ inch deep by about $\frac{1}{8}$ inch broad, into which the cuttings are placed and made firm.

Place the rows 3 inches apart, the cuttings $\frac{1}{2}$ to 1 inch apart and $\frac{1}{2}$ inch deep, in the sand, and make firm. They are watered so that the sand is saturated. In this way probably no further watering will be necessary, although of course it is fatal for the cuttings to become dry or wilted. Should the sand bed become dry a further good watering should be afforded. Wet foliage is liable to start rust, and there is no place like the propagating house to increase this disease, as the close atmosphere provides it with ideal

HOW THEY ARE INCREASED

conditions. In passing, one might remark that this is the reason why the importer of new varieties from America has such trouble from rust; the plants are packed so closely for the journey that as a result the cuttings develop the disease after arrival.

We now need a bottom heat of between 50° to 60°, and two rows of pipes (a flow and return) under the bench are the best means to obtain the necessary temperature. At Bush Hill Park we do not enclose these pipes with bricks or boards, but prefer to place sheets of tiffany or sacking from the bench to the ground. These confine the warmth and can be readily raised should the heat from the pipes become too hot. We keep these sheets damp and thus avoid a dry heat in the propagating house. We have no overhead pipes to cause any unnecessary warmth in the propagating house.

Don'ts for Propagators.—Don't select weak cuttings, but healthy pieces 3 inches long.

Don't use dirty sand, which is sour.

Don't let the propagating bed exceed 60° or the house 50°.

Don't coddle the cuttings when once rooted.

Don't let direct rays from sun strike the cuttings, but protect with sheets of paper.

CHAPTER III

THE SECRETS OF SUCCESSFUL CULTIVATION

THE method of growing the young plant until it is placed in the flowering pot is governed by various set rules, and it is after this point that growers vary considerably in their methods. Some place their plants directly on ash beds in the open. Others grow them in frames first, then place in the open; while yet others advocate growing the plants entirely under glass throughout the year. This last method is undoubtedly correct with certain sorts which are subject to rust and spot, such as Mrs. Burnett, Britannia, and Carola. There are so many ways to the same end! The Americans, who grow their plants on the "bench system," take the young stock from 3-inch pots and plant them directly in the open about the month of May, grow them outside until July or August, then plant them on benches under glass. Some growers in this country pursue the same course, while others grow them planted out of doors until August and then pot them into 6-inch or 7-inch pots instead of planting on benches.

Growing Plants in the Open.—For success in the process of planting in the open it is absolutely necessary that the soil be well dug twice, to ensure well-rooted plants when lifting time comes. Further,

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the Dutch hoe should be kept going weekly throughout the growing season, with the same object in view. To enable the hoe to be used with ease the plants should be placed in rows about 1 foot apart and 18 inches between the rows. Beds of five rows are most convenient. This warning cannot be too strongly emphasised: never plant young Carnations deeply, nor deeper than when they were in pots, or stem rot will be an early trouble.

Plant firmly, working the soil well around the ball of the young plant. It is hardly necessary to mention that when potting up from the open ground care should be taken to lift a small ball of soil with the roots, which should not be disturbed more than necessary. I say a small ball of soil, because sufficient room should be left in the pot for fresh potting compost to be added for new roots to enter. A point which may strike one as curious is that when potted up and housed it is neither necessary nor advisable to shade the plants heavily. If not heavily shaded they make fresh roots more quickly. After potting, water the plants and spray two or three times daily to prevent their flagging. Admit full air, but avoid draughts.

No one can call the growing of Perpetual Flowering Carnations tedious. If the system just referred to does not appeal—and, personally, I do not advocate it, although it is a cheap method—try that of returning the plants which are freshly potted into their flowering pots to the greenhouse, or keep them in a frame until

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nicely rooted. As soon as the roots appear at the side of the pots the plants may be placed outside. If the pots are plunged to the rims much labour in watering is avoided, but there should be space beneath the bottom of the pots to prevent the roots growing through into the ground.

Although I advocate growing Carnations out of doors in summer, at least three sorts do best cultivated entirely under glass. These, as I have mentioned previously, are Mrs. Burnett, Britannia, and Carola, and any sorts prone to rust or spot are best grown in this way. The general details of this method do not vary from the system advocated throughout the book. In abnormally wet seasons, to prevent the plants becoming waterlogged when in the open, it is advisable to place frame lights over them. It is well worth the trouble, and I would strongly advocate the use of these lights, which could be permanently placed over the plants by fixing (to avoid being blown off during strong winds) on temporary framework sufficiently high that they may be watered overhead without removing the lights.

I propose to treat the processes of potting on and "stopping" in the order in which they are carried out. We now possess sturdy young plants with roots $\frac{1}{2}$ inch long, and the next step is to get them potted.

Potting and Repotting.—Potting Carnations can be carried out correctly and incorrectly. Correct potting cannot be learnt solely from a book, but rather by a little study and plenty of practice. He



Fig. 3.—Potting on the Young Plants—First and Second Steps.



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who fixes a young plant in a pot with soil around the roots has not necessarily potted it correctly. Not that potting need be done in a slow or cumbersome manner. The more expeditiously carried out, of course, the better, when large numbers of plants have to be attended to. As soon as the roots of the cuttings are from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch long, no time should be lost in shifting into the first pot. In the dull months of winter we use a 2-inch pot—the smaller one illustrated in Fig. 3. These are more suitable than the $2\frac{1}{2}$ -inch or 3-inch pot, for they contain less soil and the young cuttings become more quickly established. The soil for this operation should naturally be of a finer nature than that used for subsequent pottings, and consists of two parts loam and a third part composed of equal portions of leaf mould and sand. If possible, add half a dozen 7-inch potsful of burnt ashes to a barrow-load of compost; well mix, and pass through a fine sieve.

The first care in potting rooted cuttings should be to see that they are not planted too deeply in the pot; in fact, the roots should not be covered by more than $\frac{1}{4}$ inch of soil. No pressure, of course, should be used in the first potting, but the soil should be made just firm with the thumbs and two or three sharp taps of the pot on the bench. If the soil used is moderately moist the cuttings need not be watered in, but just sprayed overhead and covered with sheets of paper to protect from draughts and the direct rays of the sun. Stand the young plants in a temperature

PERPETUAL CARNATIONS

of between 50° and 60°; avoid draughts; and, in fact, keep rather close for the first few days, until the roots show signs of having taken hold of the soil. Then give water, gradually harden off and allow more air until the young plants are in a house the ventilators of which are never shut except in cold, windy, or foggy weather.

At the end of three or four weeks we should possess sturdy young plants, with roots round the sides of the pots, and the tops of the plants commencing to grow. It is then that a further potting into a 3-inch or 3½-inch pot may be indulged in. The soil on this occasion should be as used for the first, except that it need not be of so fine a nature and only passed through a coarse sieve. To each barrowload of soil add some half a dozen 7-inch potsful of wood ashes or brick rubble. Use well-drained clean pots, so that the roots do not adhere to the sides before the next potting. Remove the small crust or surface of the ball of soil, without actually breaking the ball, and do not pot deeply. Only just cover the previous ball of soil with the compost, which should be made firm with the thumbs without being potted hard, and the soil thoroughly worked round the roots by several sharp taps of the pot on the potting bench. Water the young plants a few hours before repotting, and use the fresh potting compost moderately moist.

The Final Potting.—At the third potting the plants are put into their flowering pots. They should be ready for this within a month or six weeks of their

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second potting into a 3-inch or $3\frac{1}{2}$ -inch pot. The pots in which the plants are to bloom should be 6, 7, or 8 inches in diameter. If this operation is carried out before the month of April, when root action is somewhat slow, a 5-inch pot is used previously to a larger one, which is then employed four to six weeks later. The 7-inch is the ideal size, although market growers who intend to grow their plants for two years in the same pot prefer one of 8-inch diameter. The composition of the soil for the final potting is of importance, and it differs in many ways from that used previously. As the roots are vigorous a much coarser compost should be employed. Where the loam is neither very heavy nor very light, take 4 parts turf loam, preferably a few months old, $\frac{1}{4}$ part of sand, $\frac{1}{4}$ part of mortar and lime rubble, and 1 part old cow manure or well-rotted stable manure. To this add an 8-inch potful of wood ashes and a 5-inch potful of Carnation fertiliser to each barrowload of soil, and you have as near an ideal soil for Carnations as possible.

The skilled cultivator would vary this according to the nature of the loam, bearing in mind that the Carnation loves a thoroughly porous soil. Should the loam be somewhat heavy, a slightly increased proportion of sand and some leaf soil would meet the case ; or should the loam be light, an increased proportion of this to a decreased portion of sand and mortar rubble will give the best results. All large lumps should be broken. Pot firmly for the final operation.

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In some gardens a potting stick or rammer is used, although at Bush Hill Park we pot firmly without this assistance. Drain the pot well with crocks and preferably a layer of $\frac{1}{2}$ -inch bones. Do not bury the ball of the soil much below the previous potting. This is important and if neglected may give rise to stem rot later on.

“Stopping” the Shoots.—The roots having reached the sides of the 3-inch or $3\frac{1}{2}$ -inch pots, and the plants being some 5 inches or 6 inches high, the first stumbling-block in growing Carnations appears. So many cultivators neglect the operation of “stopping,” which is the only way to obtain nice bushy plants. I would advocate “stopping,” or removing the top of the growth, at about 3 inches above the soil. This is done by simply pulling out or breaking off the top of the little plant, preferably just above a joint 3 inches from the soil.

While on the subject of “stopping,” I should like to call attention to the difficulty, or rather actual impossibility, of giving clear, dogmatic rules as to “stopping.” Just as the pruner of a rose must know the variety upon which he is operating, so the most successful cultivator of Carnations must know the varieties and their style of growth. Some growers advocate “stopping” for the first time after the plant is in a 5-inch or 6-inch pot, and the theory is good, because the plant then breaks into growth more freely. However, there is not always time for this delay, and I am describing the system adopted at



Fig. 4.—Plants Showing the Result of the First and Ready for the Final Stopping.



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Messrs. Low's nurseries. The reason for "stopping" is to produce a bushy plant, with several flower growths; but "stopping" can be overdone, and too many growths, produced artificially, fail to give fine flowers.

The Second "Stopping."—The second "stopping," the result of which is seen in the larger plant in Fig. 4, is an important point in Carnation cultivation, and is the final one with most sorts. The end of the shoot should be broken out as in the first operation. The "stopping" is made when the shoots have produced a further growth of about six joints after the first "stopping," as indicated by the arrows in Fig. 4. Some growers "stop" too high by merely breaking off the shoots running to flower, as indicated by the tie in Fig. 4. The chief difficulty lies in getting the operation performed at the right time. An American grower coming to this country would, under his system, have the plants in flower in January instead of October, the month when we aim to secure our first blooms. The reason, of course, is not difficult to see, for the amount of sunshine with which the American cultivator is favoured far exceeds that of the United Kingdom.

It is a truism that there is "nothing like bought experience," and be it ever so bitter, experience of this nature impresses itself for the rest of one's life. I well remember the first attempt of a young grower of the American school to produce a crop of bloom in autumn. "'Stop' early and late," said he,

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to get good bushy plants, and he did "stop" late. Well into August he was merrily "stopping," with the result that the main crop of bloom did not appear until after Christmas. It is true that the Carnations were planted out on benches, and this method is only favoured by a few growers in England to-day on account of the slowness with which the plants come into flower.

The Date for Final "Stopping."—The date at which to "stop" for the second and final time varies with different sorts. A quick grower which is prone to run to bloom may be "stopped" later than another sort that is of slow growth. Such varieties as Britannia, Baroness de Brienen, etc., should not be "stopped" later than June. Most varieties, including Enchantress and what are known as the Lawson family—that is, varieties with a similar habit, such as Winsor and Mrs. Lawson—should be "stopped" not later than early or mid-July. This is a favourable and safe season for finally "stopping" the majority of sorts should one not be acquainted with their individual peculiarities.

With the object of getting the plants to bloom continuously, instead of having all the shoots coming into flower at once, it is not desirable to "stop" a plant for the last time in one operation, but the various growths should be "stopped" at intervals of three or four weeks. In this way a long season of flowering is assured. I have in mind that lovely new salmon rose-pink variety, Lady Alington, that was first

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exhibited in October. The same plants continued to bloom, and were exhibited, at intervals of fourteen days, throughout the entire winter, and right on till July. Truly a long flowering season!

Notwithstanding that the last "stop" takes place in July, any shoot elongating to bloom throughout August should be broken back once more at about the sixth joint, as indicated by the arrow in Fig. 4, unless one requires flowers in September, which is seldom the case.

Shading Carnations Under Glass.—This is a subject on which many doubts exist, for it is unwise to overshade, and soft, sappy growth is the result instead of that of a ripened and sturdy nature such as is desired. On the other hand, it is undoubtedly necessary to shade during the months of May, June, July, and August, as much for the sake of the plants, which otherwise require too much water, as to keep down the attacks of red spider and thrips, and for the blooms of the plants which are in flower, for unshaded Carnation flowers in summer fade, and are consequently of less value.

After the final potting a detail to be observed is that of watering. The shift from 3-inch or $3\frac{1}{2}$ -inch pots into 6-inch, 7-inch, or 8-inch pots is considerable, and a large body of soil without roots penetrating into it is liable to become sour if over-watered. Keep the plants, therefore, rather dry until the roots appear at the sides of the pots. Then copious waterings may be given and the plants never allowed to become dry.

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Disbudding Flowers.—This is, of course, a simple operation, generally understood by most people, so that reference to it would almost seem superfluous. Nevertheless, to make this little work as complete as possible, I would remind readers that disbudding should be carried out in good time, the idea being that the strength which naturally would go into a collection of buds should be concentrated in a few as soon as the buds are, say, the size of a grain of wheat. Carnations do not grow very rapidly in early summer, but they may be assisted to get quickly under way by spraying and syringing night and morning during hot and dry weather. As the summer advances this is of much assistance in keeping down the summer enemies, thrips and red spider.

As soon as the roots show well around the inside of the pots, weak soot water once or twice a week, applied to both foliage and roots, is of great assistance in keeping the plants in health and vigour. In alternate weeks give liquid manure to the roots only.

Staking and Tying.—The month of July should find us with bushy, sturdy little plants that will soon require to be tied. This must have attention immediately it is necessary, or a rough wind may do much damage. A plant left untied soon deteriorates, as the stems grow crooked and out of place. A 2-foot bamboo cane is the best stake to use, as it does not rot so easily as many other sticks. There are various methods of tying, and of course right and wrong ways. The base of the plant should first be secured, and the



Fig. 5.—Carnation "Lady Alington."
Showing Perfect Habit of Plant and Circular Wire Support.



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central growth also be tied loosely to the stake. Green raffia is the neatest and most practical material to use. The second tie (securing the central shoot), having been made, leave the two ends of the raffia 6 or 7 inches long, and split them, thus forming several strands by which the various shoots can be loosely looped into position. Some growers, after the first tie at the base of the plant, do nothing further than pass a band round the whole of the plant to prevent the growths falling out of position ; but this does not give a smart appearance, and in an amateur's garden would be considered a slovenly method.

Care should be taken not to tie tightly ; it is well to remember that the plant is growing and the shoots are swelling, so that every allowance should be made for this. At Bush Hill Park we do not tie the plants, but employ a useful plant support. This is an adjustable wire ring which can be opened to make it larger or closed to reduce its size. It clips to the centre stake, and thus secures the entire plant from the centre (*see* Fig. 5). Soon certain shoots will show signs of bloom. Do not hesitate to break these off or "stop" them, as early flowers in August or September are usually neither profitable nor desirable. Do not "stop" them later than July or the shoots in the majority of varieties will not flower before the New Year. The accompanying illustration (Fig. 4) shows a plant after the first "stopping," and one ready for the final "stopping." The arrows indicate clearly where this final "stop" should be

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made. The tie above shows how they should not be broken.

General Hints.—A good beginning in Carnation growing is important, so my earnest advice is to see to this with every care and ensure that the young plants, whether home-grown or purchased, are the very best. The cheapest are often the most expensive in the end. The stems of young plants kept in small pots until they are starved for the want of fresh potting become hard and wiry, and such Carnations seldom develop into free-growing plants.

Temperature and Ventilation.—During winter sunshine and a buoyant atmosphere are the chief aids to success. Although we cannot control the one, we may regulate the other. In winter, when cold winds are prevalent, we give air through the top ventilators, which are always open except on days when piercing winds are blowing or it is foggy.

It goes without saying that if the wind is from the north we open the ventilators on the south side and vice versa, for draughts must be avoided. The proper temperature in winter should be within two degrees of 50° Fahrenheit, and an ideal Carnation house should be so heated that the temperature can be kept uniform. If, in making up the fire at night to last until morning, it is so arranged that it will cause the temperature to rise to 60° and then fall by the morning to 45°, do not be surprised to get weak and soft stems which will not hold the flowers erect, or that they come with split calyces, for split

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calyces are frequently the result of extremes of temperature.

In the spring, on sunny days, the temperature may rise without fear of bad results providing plenty of air is given, just as on dull, sunless, wintry days the temperature may be as low as 45°, providing slight warmth in the pipes and a little air from the ventilators accompany the fall in temperature. The same temperature with no warmth in the pipes or with closed ventilators would be courting failure.

To maintain an even, buoyant atmosphere, then, we need warmth in the pipes and open top ventilators. The new method of heating with overhead pipes and other details are given in the chapter on "Suitable Houses, etc."

As the spring and summer advance the temperature need trouble us no further; 60° to 70° and above do not matter. With ventilators open and the syringe used every morning, Carnation growing has few troubles, and for these (red spider and thrips principally) we have a cheap remedy in water applied by force from a syringe. When growing Carnations under glass in late spring and throughout the summer, a slight shading is desirable. Increase the shading during the hot, sunny days of June, July, and August. However, it is important to shade with moderation, and unless we have abnormally bright weather the shading should never be put on thickly, or soft and sappy growth is the result. A mixture of slaked lime and water is used in the proportion of $\frac{1}{4}$ pail of lime

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to 1 pail of water, strained and sprayed on the glass with a syringe. Amateurs would find it somewhat more convenient to take two balls of whitening dissolved in a 2-gallon pail of water, and spray the mixture on with the syringe. This is not lasting, so must be repeated should rain wash much off. A clean ready-made preparation sold by most nurserymen is "Summer Cloud." This is a good material for shading. Let all shading which the rain has not already washed off be cleaned from the glass early in September, so that the growths may be well ripened for winter flowering.

An experienced gardener, new to Carnations, would not need to be told to keep his houses clean, but beginners should bear this important point in mind. Old foliage, decaying leaves, dirt, or refuse of any kind in the Carnation houses, stagnant water, and moisture beget diseases of fungoid nature. The best grower runs no risk, but washes down or paints the inside every season, and cleans the outside glass as often as fogs begrime it.

Fumigating.—An important item in the general cultivation of Carnations is fumigation. This should never be overlooked, for, as I have stated on another page, probably no plant suffers more quickly from the attacks of green fly. I have fully dealt with this subject in the chapter on "Insect Pests and Diseases." Many growers fumigate regularly once a month, whether the plants are affected or not, and the policy is no extravagant one. "Prevention is better than

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cure," and the practice might well be carried out by all cultivators of the Perpetual Flowering Carnation. There are several excellent fumigating materials on the market. We find the preparations known as "Bull's Fumigating Compound," and "XL All," to be excellent.

Two-Year Plants.—Many amateurs are puzzled as to the wisdom of retaining their plants for a second year. It pays a market grower. For an amateur or private grower it also pays; but, on the other hand, two-year plants are not so sightly; they are often "leggy." Whether or not one should retain them is a matter of taste. At any rate, they should be kept until there is something better to take their place, but young plants should not be crowded for the sake of keeping the old ones. Many are puzzled as to the method of cutting back the old plants. The best way is to shorten the previous season's growths by one half, and to remove entirely any very hard or crowded stems.

CHAPTER IV

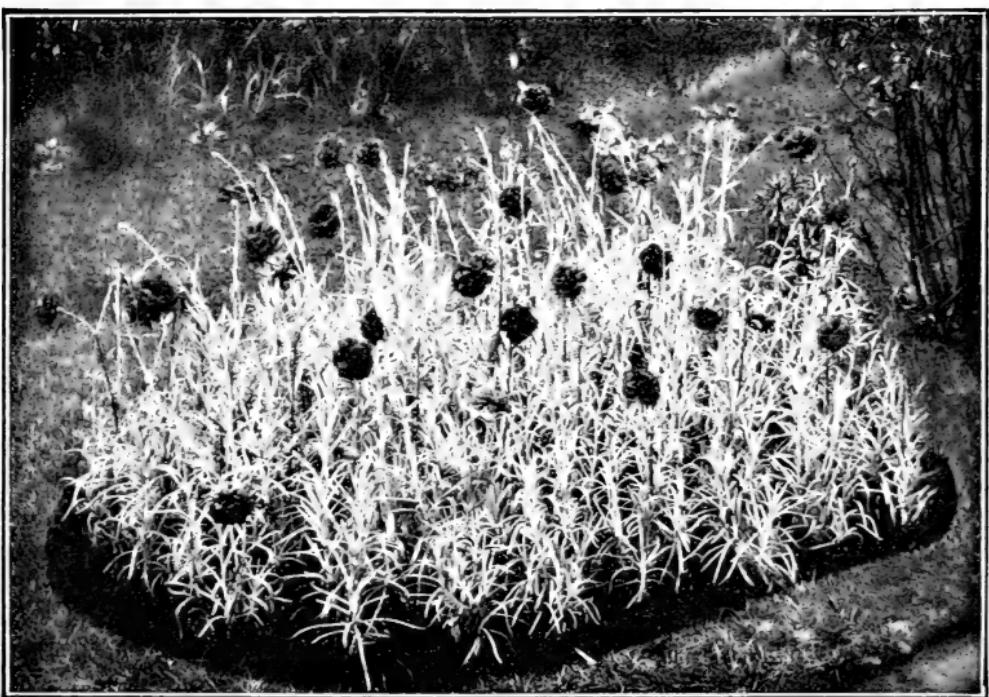
THE PERPETUAL FLOWERING CARNATION AS A BORDER PLANT

WHEN it was affirmed a few years ago that the Perpetual Flowering Carnation was a useful plant for bedding out, many disbelieved that this section of the Carnation family was hardy. One is so accustomed to see it grown under glass that the idea of cultivating it out of doors seems strange; nevertheless, the Perpetual Flowering Carnation has a better constitution and is, in fact, hardier than many of the so-called border sorts.

Much has been said, and much has been misunderstood, on this subject. Most people succeed, but some fail with the Perpetual Flowering Carnation out of doors, the reason of the failures being chiefly the employment of young spring-rooted plants. These are not satisfactory, because between the period of striking the young plants and the summer there is insufficient time to form the foundation of a good plant. We should employ those rooted the previous year, preferably in May—plants that have been “stopped” twice, say in July and September (not later than October), and wintered in a cold frame. In March they will begin growing, and may be planted out at the end of April or early in May; the growths



Enchantress.



Britannia.

Fig. 6.—Perpetual Flowering Carnations Out of Doors.



AS A BORDER PLANT

will then soon elongate for flower. Some prefer early autumn struck plants, which are “stopped” once, potted into 5-inch pots in January, and planted out in April.

Not only in its perpetual habit does the Perpetual Flowering Carnation excel the border varieties. From plants grown as I have indicated, and put out early, one may expect blooms by the end of June, and the plants continue to flower until the frost comes. On the other hand, the border sorts only flower in July. There is yet another advantage in the Perpetual Flowering Carnation as a border plant. If lifted early, carefully potted, or planted in boxes and housed, moderately good flowers may be expected throughout the winter. I would not like to promise too much from them if the plants are left out late enough for the autumn rains to cause a soft, sappy growth, because such growth is liable to develop rust under glass, and in some sorts, notably Britannia (one of the best sorts for bedding), Carnation spot will sometimes attack the plants when housed late after a wet autumn.

What to Do with Old Plants.—Year by year Carnation growers have old plants which, though flowering profusely, have to give place to younger stock, but one is yet loth to throw them away. My advice in such cases is to plant them out of doors, when they will continue to flower throughout the summer. If they have a “leggy” appearance, place younger plants at the base of them; they will hide

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the bare appearance of the older, while developing themselves. I have known three-year-old plants, placed somewhat closely together in beds with a line of young ones planted on the outside row, give a wealth of flowers throughout the summer.

If the weather is dry, water the Carnations as soon as planted. They should be planted sufficiently wide apart (about 1 foot) to allow the Dutch hoe to be used repeatedly throughout the summer. Hoeing in summer is as necessary to Carnations as any other plant. In planting out of doors the soil is best treated as for border Carnations, which prefer a sandy loam well dug and manured. If the soil is clay, lighten it with sand or road grit from gravel roads (not from macadam roads or those likely to have motor grease and oils on the surface), or cinder ash, and give a good dressing of wood ashes and lime in winter. In sandy soils make the most of it by digging in and dressing heavily with cow manure. Plant firmly, and tie up the growths at the time of planting ; the flower shoots will then grow in an upright position, instead of falling down and having crooked stems.

I am convinced that it is only a matter of time before the number of devotees of Perpetual Flowering Carnations treated as bedding plants will exceed those who grow them under glass, for everyone has a garden, but comparatively few possess a glass-house suitable for flowering the plants in winter. Perpetual Flowering Carnations should either be

AS A BORDER PLANT

grown in separate beds or among low-growing plants, such as the dwarf varieties of roses. They do not succeed mixed up with ordinary herbaceous plants, which are liable to overgrow them.

Varieties for Bedding Out.—In the past professional growers have been in the habit of dividing Carnations into the Lawson family, with growth similar to Mrs. T. W. Lawson, and the Enchantress family, with growth similar to Enchantress. If I were certain of explaining my meaning fully, I would say that of the two families the Enchantress succeed better out of doors. However, to-day, with the innumerable crosses between the two families, it is impossible to classify many sorts, and it is only necessary to say that all the strong growers succeed well in the open, but the colours which fade or burn so easily in the sunshine, such as Winsor and Mrs. Lawson, should be avoided for this purpose. The following is a selection of the best for outdoor work ; I have marked the most fragrant with an asterisk : *White*.—White Enchantress, Marchioness of Linlithgow,* White Perfection.* *Red*.—Britannia, Beacon, Rival. *Pink*.—Lady Alington,* Rose Enchantress or Dorothy Gordon, May Day.* *Fancy*.—Mis. T. M. Crook,* Helen Gould, Alma Ward,* Fire Glow, S. Gratrix.* *Crimson*.—Wanoka,* Ruby.

To summarise the process of growing Perpetual Flowering Carnations out of doors. In winter well dig the ground and apply manure, and should there be any suspicion of the presence of wire-worm or eel-

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worm dress heavily with lime or soot. In April put out plants that were rooted the preceding May. For making complete beds of Carnations plant firmly about 1 foot apart, and tie the growths securely to thin stakes. Use the Dutch hoe frequently throughout the season.

CHAPTER V

RAISING NEW VARIETIES FROM SEED

PERPETUAL Flowering Carnations receive plenty of attention in this direction, more perhaps than they deserve, and, enthusiastic grower as I am of Perpetual Flowering Carnations, so far as the ordinary grower is concerned I can never see the return for one's time and trouble in raising them from seed. The fond parent thinks there is no child like his own, and there is some excuse for him; but one seldom meets the raiser of Carnations with any sort of modesty in connection with varieties of his own raising. One is expected to admire anything and everything in this way that grows well and throws a flower of any size, and no matter how poor the habit of plant, how worthless the calyx, or how devoid of perfume the blooms may be, some good point is found for the new aspirant to fame, which is often boomed until sad experience consigns it to the dust-heap.

To the raiser of new Carnations I would say, do not attempt to name one of your seedlings unless it will pass muster among others of similar colouring. Is it distinct? If distinct, has it a real perpetual and free-flowering habit? If not distinct, is it an improvement on the best variety of its colour, and,

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above all, in habit of growth, in size, and fragrance of flower? If any two of the above queries can be answered in the affirmative, by all means grow the seedling for another year. It may even improve, but do not be disappointed if, as is more likely to be the case, it deteriorates and proves to be worthless.

My first attempt at crossing varieties of Carnations was with the Malmaison and Perpetual varieties. Malmaisons were at the zenith of their popularity, and we wanted a perpetual flowering "Princess of Wales." That was in 1901, but to-day the real perpetual flowering "Princess of Wales" does not exist. Of course, pollen from a Malmaison is difficult to obtain, and many a time, on an ideal day for the purpose, have I walked round the Malmaison house without securing so much as one anther bearing pollen. Malmaison pollen can, of course, be obtained, but chiefly in the smaller blooms and those of moderate size.

The varieties of Perpetual Flowering Malmaisons in commerce now are not numerous. The first one of this class, Marmion, is a fine flower, but not easy of cultivation; the second, Lady Nield, is almost identical with Marmion in flower, but of better growth. Mrs. C. F. Raphael and Princess Juliana, the orange-flame coloured variety, are both good and really perpetual.

Pollination and Cross-fertilisation. — In attempting to appraise the value of Perpetual Flowering Carnations, one should first consider the

RAISING NEW VARIETIES FROM SEED

habit of growth. Good colour, scent, and form we have already in existing sorts of Perpetual Flowering Carnations, and especially in "border" varieties; so that, to my mind, unless we have something unique in colour, in size, or in perfume, or there is exceptionally good growth, a new variety is worthless. If a new variety does not produce good flowers and plenty of them long before Christmas, it cannot rank as a first-class Perpetual Carnation.

In selecting two varieties to cross or hybridise, it is well to have a definite point in view. Carnations are not easy to cross by rule of thumb; they give more erratic results than any plant with which I am acquainted. Mendel's law can be proved and quickly refuted by the results—like seldom produces like to any extent. The seed parent will, however, most likely chiefly influence the habit of growth, whereas the pollen parent probably will control the colour and form of flower of the seedling. If, for example, one selects a variety of certain colour, but of poor habit, and conveys pollen from this to a variety of good habit, such as Lady Alington, the result should give at least some plants of the desired colour and an improved habit of growth. If the organs of a flower are examined, one finds stigma (*a*), surrounded by the anthers bearing pollen masses (*bb*) carried on the stamens (*ff*), as shown on the accompanying illustration (Fig. 7). The pollen masses are in condition for manipulation when they present a dusty or powdery appearance. The stigma is in condition

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when it is observed — preferably by means of a lens — to have a fresh, “dewy,” or minute hair-like appearance (*c*).

Pull out a few petals, as shown in the flower on the left of the picture, and remove the anthers or pollen masses of the flower to be operated upon while the flower is young, not when it is fully developed. Convey the pollen (*b*) to the stigma (*a*) by means of a camel-hair brush or pointed piece of blotting paper, placing it on the stigma in the same direction as the minute hairs incline, so as not to injure the hairs by rubbing them the wrong way. The utmost care must be taken to observe this point as, if injured, the stigma will not “take” the pollen and convey it through the style (*c*) to the ovary (*d*), where seeds are formed. As soon as the pollen has “taken,” the flower withers and dies. The plant may then be placed in a dry situation, so that no moisture falls on the seed pod. The pod gradually becomes brown, but should not be gathered for several weeks, until, in fact, it looks dry and inclined to crack. The flower to be operated upon should appear as in No. 1. Nos. 2 and 3 are dismembered to show the various organs more clearly.

In raising young seedlings do not be disappointed with poor results. You will be sure to have plenty of singles, split calyces, and misshapen flowers. We raise annually 3,000 to 5,000 seedlings. We only save from five to ten in a hundred of these, and not one in a thousand is finally put in commerce as an “improvement on already existing varieties”

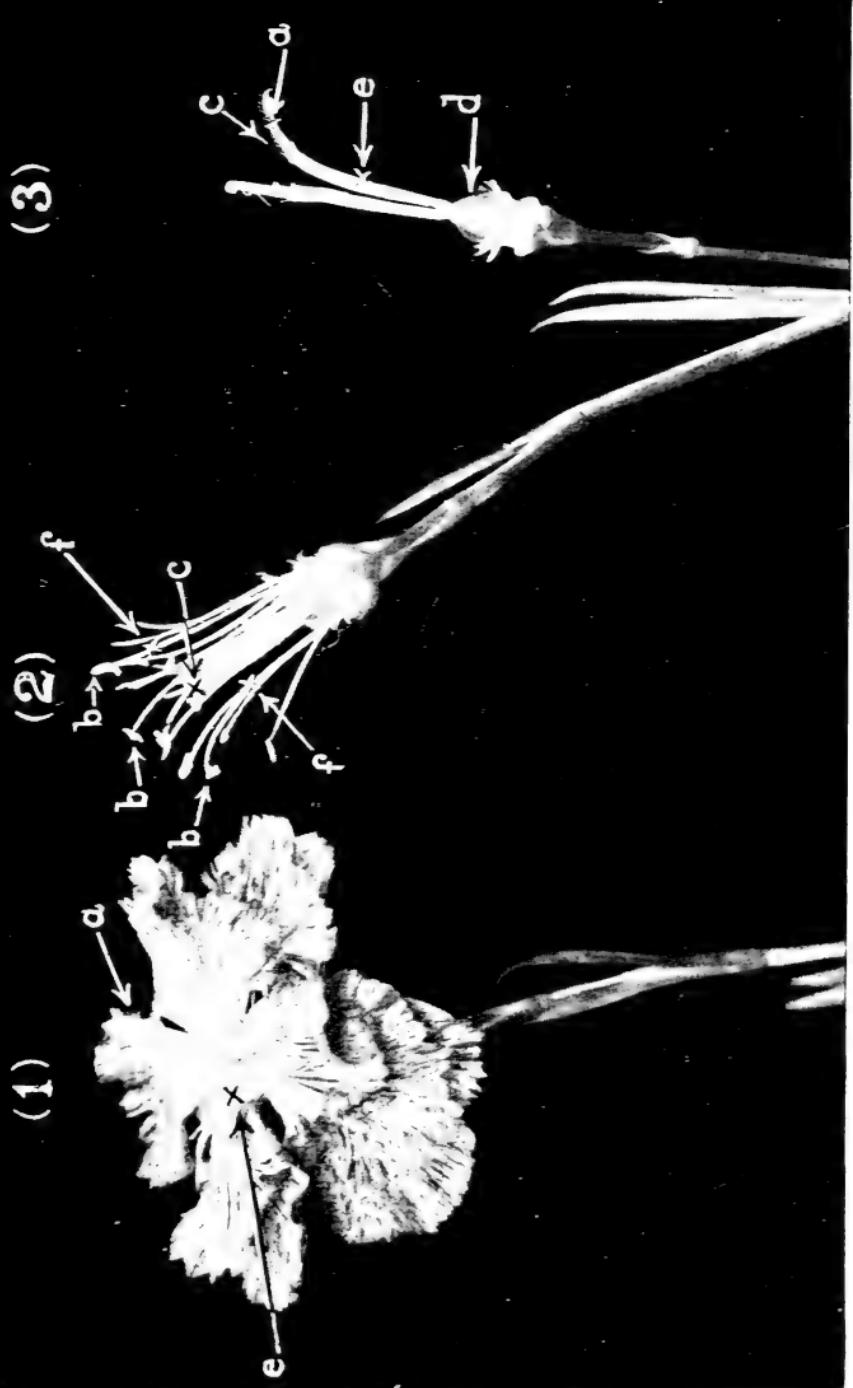


Fig. 7. (1) Carnation Flower Ready for Cross-fertilisation; (2) Showing Stamens and Pollen;
 (3) Stigma, Style and Ovary (see figures 37 and 38).



RAISING NEW VARIETIES FROM SEED

Sowing Seed.—In order to raise sturdy plants to flower the same year, it is needless to say that the seed should be sown early. January and February are the best months. The soil should consist of 2 parts well-sifted sandy loam, 1 part sand, and 1 part leaf mould, passed through a fine sieve. Scatter the seeds thinly on the surface, not allowing them to touch one another, and only just cover with the finest soil. A sheet of glass covering the surface of the soil prevents rapid evaporation and hastens germination. Prick off the seedlings into "thimble" pots as soon as the third leaf appears, planting them as deep as the first pair of leaves. Place on a shelf or bench in a light airy position in a temperature of about 60°. Pot on into 3-inch pots as soon as well rooted and the fifth or sixth leaf appears, and gradually harden off by affording more air and a cooler temperature. It is not necessary to "stop" or pinch these plants, as the aim should be to flower them as soon as possible in order that the absolutely worthless varieties may be thrown away and more room left for the others to be grown on to flower a second time. From 20 to 30 per cent. of singles and 40 to 50 per cent. of otherwise worthless varieties should not prove disappointing, for this will be the average result if one's standard is as high as it should be.

Many amateurs would not quickly recognise the ideal habit of growth. It is of the greatest importance in judging the value of a new variety. The plant should be free and continuous blooming, one

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that, while producing shoots freely, is not too leafy and given to producing innumerable small shoots. The ideal habit is to be seen in a plant which, when in flower, is already commencing to make further growth for a second bloom at the base of the flower stem, and not, as in such a sort as White Perfection, very slow in forming a second growth. The best type of growth is found in the varieties Lady Alington, May Day, and Beacon. The Enchantress family has a good habit, although scarcely quick growing enough. The Lawson family, as represented by Winsor, is also excellent in this respect; but the style of growth as seen in that old and now discarded variety Floriana, which produces all its flowers at once, or in Harlow-arden, which is a slow, thin grower, may be counted among the worst, so far as habit of growth is concerned.

Types of Flowers.—Standards of beauty are often a question of opinion, but perfect types in Perpetual Flowering Carnations must possess flowers which open well during mid-winter in our somewhat dull climate. Not all those sorts that produce finely developed blooms during winter in America, or even Guernsey, open readily in Great Britain, and especially in the less sunny parts of our island. As a rule, blooms of fine form, with round, even petals, so much sought after by the older school of Carnation enthusiasts, do not open so quickly as the varieties with serrated petals, which are typically American. The large-flowered varieties, with blooms packed

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with petals, are also often "bad openers" and come with split calyces or discoloured flowers through opening so slowly. The type of flower to succeed well in our climate should not possess too many petals, and flowers with slightly serrated petals are more likely to open well than those with smooth edges. "What of May Day and Britannia?" one may ask, but my reply is that these varieties at the present day are the only exceptions that prove the rule.

Form of petal is by no means the only consideration in an ideal flower; perfume adds one of the greatest charms, and colour is of equal importance. A colour that is constant and does not fade easily adds largely to the value of a variety. Amateurs probably do not consider the substance of the petal in the same light as an expert grower. A grower who "ships" his flowers, as our American friends describe the dispatching and packing of blooms, needs a flower that will travel well—one that has thick petals which neither bruise easily nor break at the least touch. The rough type of flower, such as Mrs. Lawson and Winsor, has usually more substance in the petal than such sorts as May Day, which are flatter and of more even petal.

I have left the consideration of the type of flower until last, for, to my mind, we have in the past erred in discarding all varieties which split a little, just as, a generation ago, all plants bearing flowers with serrated petals were thrown away. Most people will agree that Enchantress has been in the past one of

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the most perfect of Carnations, considered from all points of view, and yet this variety must be classed with the "splitters." Many a one would like to live his life again, and I feel this particularly with reference to Carnations we have raised, for we have thrown away thousands of varieties good in every respect except as regards calyx, and I would like again to have the opportunity of considering these. The perfect calyx should be large and somewhat loose, to enable the petals to unfold with ease. The short calyces usually produce badly split flowers, while the long ones—and when long they are usually narrow (as in Harlowarden)—seldom produce a flower up to the average in size. There are now many varieties with perfect calyces, such as Beacon, Rival, Britannia, Mrs. Crook, White Perfection, Baroness de Brienens, etc.



Fig. 8.—A Perfect Calyx—"Baroness de Brienens."



CHAPTER VI

MALMAISONS AND PERPETUAL FLOWERING MALMAISONS

MALMAISON Carnations, while grown only by few gardeners, are well worthy of cultivation by those who have sufficient glass or frames to house them in winter. For making a blaze of colour in spring and summer the best varieties are unrivalled, even by the Perpetual Flowering Carnations, and the great demand for large blooms may be satisfied by such Malmaisons as Princess of Wales, Souvenir de la Malmaison, Blush, The Colonel, and other similar sorts. I am no advocate of Malmaisons in preference to Perpetual Flowering varieties, but when large flowers, and plenty of them at one time, are required, many a gardener would be hard put to it to find a substitute for them. Not for the sake of the Malmaison alone do I include this chapter, but for the Perpetual Flowering Malmaison, which also claims recognition nowadays.

The best way to propagate Malmaisons is undoubtedly by layering, which should be done in July. The first step is to see that the plants to be propagated from are perfectly clean from green-fly. Fumigation is a good preventive. Layer the shoots in sandy or gritty soil. We use clean grit from gravel roads. Take the plants to be propagated out

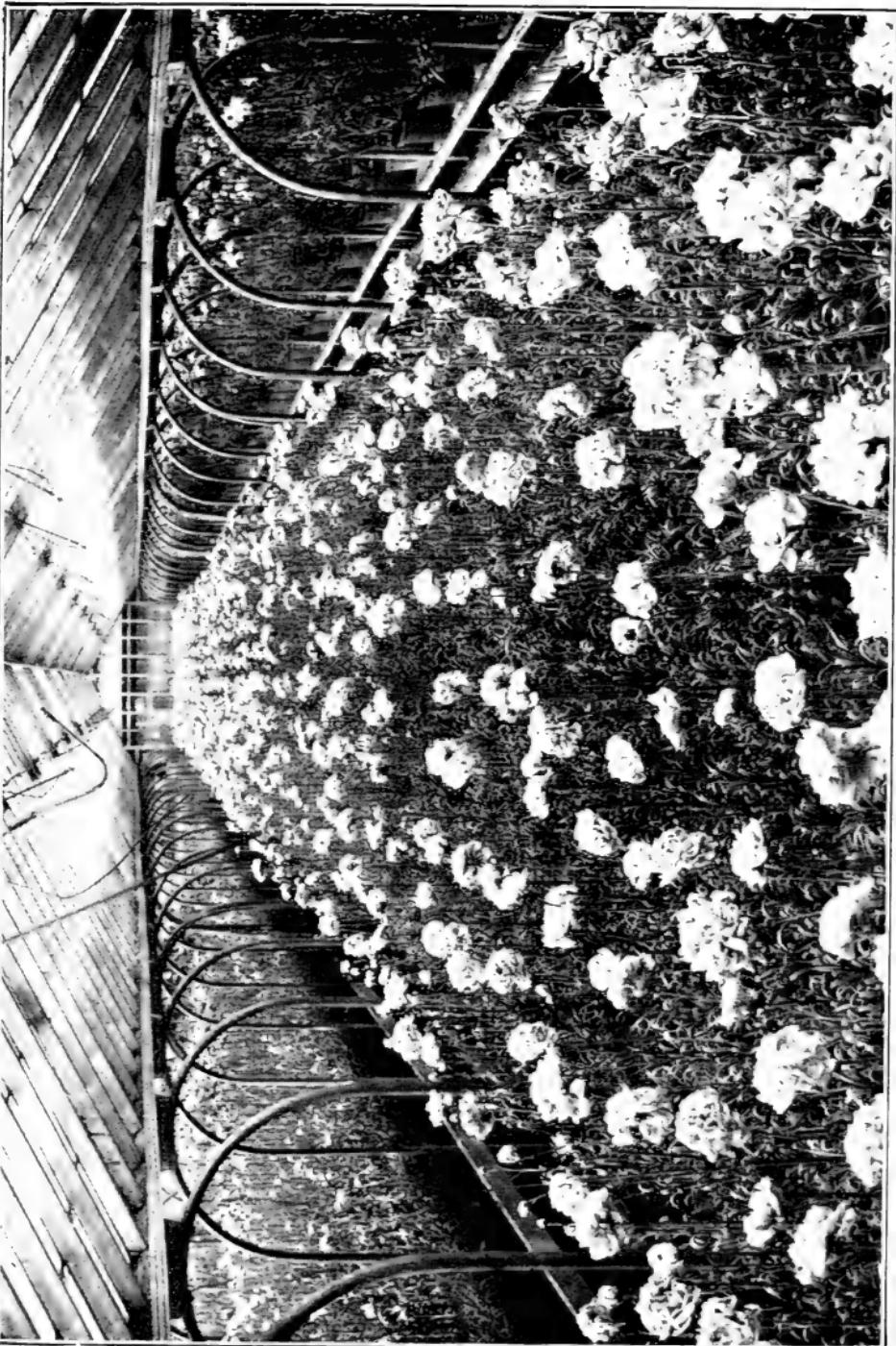
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of their pots and place them on their sides. Remove four or six pairs of the lowest leaves from the growths to be layered, and by a cut form the tongue through the partly woody stem. A sharp knife is indispensable, and a deep cut should be made just below a joint and slanting upwards for $\frac{1}{2}$ to $\frac{3}{4}$ inch. Bend the growth into the soil and fix firmly by means of a pin or peg placed over the stem; the "layered" growth is planted upright, with the cut tongue inserted in the sandy soil. Care should be taken to prevent the "tongue" being bent back or broken during the operation of fixing in the soil. Cover the cut portion to a depth of 2 inches with the same sandy soil. Sprinkle overhead with the water and cover with a frame light to shade from the sun, and to ward off excessive rains, which bring rust in a very short time.

Within a month the layers should be sufficiently rooted to pot into 3-inch pots. They should be potted immediately they are ready. Turfy loam, broken up finely, with sufficient sand added (say one-sixth) to ensure an "open" soil, is what they need. As with all other Carnations, they must not be potted too deeply; the small bunch of roots should be within an inch of the surface. Stand them in an airy frame or cool house, and as soon as they are established keep the foliage as dry as possible, for in autumn Mal-maisons are liable to develop rust, which is encouraged by moisture.

The compost for the next shift into 5-inch pots should then be prepared. Six parts turfy loam, 1

Fig. 9. Malmaison Carnations.





MALMAISON CARNATIONS

part coarse sand, 1 part well-rotted manure, well mixed, suits them. Potting should be commenced about a month from the time the layers are placed in the 3-inch pots, the idea being to keep them growing steadily at that season of the year. To ensure success with Malmaisons, the potting into 5-inch pots should be completed by the end of September or the middle of October. Potting after October is not advisable, root action then being slow and growth almost dormant, with the result that the soil becomes sour. More drainage is required for Malmaisons than for Perpetual Flowering Carnations, which are more active in growth during winter. As the root action of Malmaisons is so slow in the dull months great care must be taken in the matter of watering ; the soil should be watered only when it shows signs of becoming dry. In winter, as indeed at all other times, the matter of ventilation is of importance. Malmaisons love a dry, cool atmosphere and the temperature unheated, or with very little warmth in the pipes. An average temperature of 40° suits them better than the comfortable warmth of 50° that is necessary for Perpetual Flowering varieties.

The turn of the year will provide more work for the grower of Malmaisons. If the plants in 5-inch pots have done well they should be given another shift into 6-inch pots before the busy season of propagating the Perpetual Flowering varieties commences. For this shift Malmaisons prefer a compost made up of 3 parts of somewhat coarse turfy loam, 1 part

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well-rotted manure, 1 part wood ash, with 1 part coarse sand and a sprinkling of bonemeal, say a 5-inch potful to the barrowload.

Early in the year each plant should have a neat stick, to which the leading growth may be tied as soon as it is long enough. Water carefully and sparingly until roots are seen around the inside of the flower-pot. With the lengthening days and more sunshine the plants will soon spring into fresh life and the leading growths begin to elongate somewhat rapidly.

“Feeding” Malmaisons.—At that time (about March), if the pots be full of roots, we may commence to feed the plants. Commence with a little weak soot water, repeat at the interval of ten days, to be followed in a similar time by two weekly waterings of liquid cow manure. Watch for signs of green-fly, and fumigate the whole house as soon as this pest is observed. The end of April will see the plants in bud, and this is the time to top-dress with fertiliser, which will put bright colour into the blooms. As soon as the colour of the flower shows, cease feeding.

May is often a sunny month and should find us prepared with shading on the glass to protect the somewhat soft growth of the plants. There are various methods of shading. We use roller blinds of tiffany. If these are not conveniently obtained, a mixture of slaked lime and water, strained and syringed on the glass, answers the purpose; but care should be taken not to shade too heavily, in case of

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a spell of dull weather. As soon as the blooms begin to expand the shading may be increased. The roller blinds should always be down in sunny weather, as Malmaison flowers soon fade in direct sunshine.

Some Questions Answered.—Q. Does it pay to grow Malmaisons a second year?

A. Yes; two or three of a sort may be potted on, as soon as they have flowered. They will make nice plants the second year. Use a soil similar to that advised for the final potting, with the addition of a 7-inch pot of fertiliser to each barrowload of soil. Grow these two-year-old plants under glass.

Q. Should I disbud the plants?

A. This is a matter of taste. Those who require extra-sized blooms would do so, but I only advocate removing those buds immediately under the main bud, leaving the buds lower down the stem for a second crop of bloom.

The Best Malmaison Carnations.—Amber, a pleasing shade of amber yellow, free grower. Astarte, plum colour, an uncommon shade. Baldwin, dark pink, very large flower, an excellent variety. Blush Malmaison, the old Souvenir de la Malmaison. C. P. Little, a true yellow Malmaison. Calypso, soft flesh colour, salmon centre, petals splashed with pink. Duchess of Westminster, salmon pink with rose shading, a very popular variety. Gemma, centre deep pink, lighter pink at edges of petals. Irene, the result of a cross between Princess of Wales and Lady Grimston, salmon flesh colour. Lady Coventry,

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one of the largest, salmon red. Lady Rose, fine bright rose. Lois Sturt, clear pale buff. Lord Rosebery, bright salmon scarlet, exceedingly good form. Maggie Hodgson, dark velvet colour, darkest of all Malmaisons. Maggie Nettlefield, a fancy variety, blush pink with slightly deeper pink veining in the petal. Mrs. Martin R. Smith, produces enormous blooms of bright rose pink. Mrs. Torrens, deep pink, fine full flower. Mrs. Trelawny, salmon red, of good shape. Nell Gwynne, the only pure white Malmaison. Princess of Wales, fine pink variety, a very fashionable flower. Soult, deep salmon, fine flower. Sir Charles Fremantle, flowers of good size, deep rosy cerise. Sir Evelyn Wood, fine striped Malmaison, ground colour pale pink. Sunrise, straw-yellow, flaked with delicate pink. Lady Grimston, pale rose, flushed pink, full flower, finely formed. Lady Mary Hope, clear deep terra-cotta, a perfect shade. Sunset, a rich apricot, flaked reddish bronze on each petal. The Colonel, cherry red, large, perfect in form and petal. The Queen, terra-cotta, quite distinct.

Perpetual Malmaison Carnations.—These are in a class by themselves; they combine some of the perpetual qualities of the Perpetual Flowering Carnation with the size of the Malmaison. Propagation may be effected either as recommended for Perpetual Flowering Carnations or by layers as described for Malmaisons. They succeed equally well by either method. For potting use a soil as advised for Mal-



Fig. 10.—Malmaison Carnation Irene (Pink).



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maisons, and grow them in the same way. To flower them well in winter a slightly warmer temperature suits them best, and they will succeed in the coolest end of the Perpetual Flowering Carnation house. They need a somewhat warmer temperature than Malmaisons, though it is not advisable to grow them in a temperature higher than 45° or 50° in winter. The cultivation does not demand any special treatment, but indoor cultivation is preferable in summer, as in this way, by shading them, the growths may be kept softer than if they were in the open.

The varieties in commerce to-day are: Lady Nield, which some would class among the Perpetual (tree) varieties. This is a pretty flower of carmine rose, with a distinct blush white margin to the petals. This variety makes a better plant than Marmion, which is almost identical in flower. Indeed, the only difference is in the plant, which is of a more compact habit and less free in growth. Mrs. Raphael, reddish salmon, a large flower of true Malmaison form. Princess Juliana, a unique shade of colour, described as orange flame. Named after the Crown Princess of Holland, it has a future before it, not only on account of its good habit and continuous flowering qualities, but also on account of its beautiful and striking colour, which is unlike that of any Perpetual or Malmaison Carnation yet in commerce.

CHAPTER VII

SUITABLE HOUSES FOR CARNATIONS

How fashion changes ! Even greenhouse construction has its fashion, which changes with the course of years. Ten years ago we built small houses, and I have often heard gardeners (with large ones) express envy of our small "growing places." Just now, however, we wish we could turn our small ones into the more commodious and lofty construction which gives a larger body of air.

Carnations do not need to be near the glass ; they prefer houses which allow them plenty of air without draughts, and large houses are most suitable, because a buoyant and equable temperature can be more easily maintained there than in small houses. Thus the ideal house should be lofty, with glass sides and ventilators. These ventilators should extend the whole length of the house, both on the sides and in the roof. Here is the description of the kind of house which Mr. Duncan Tucker recommends : "The most suitable house for Carnations is a span-shaped roof with side framing of glass. The ventilation of the sides is an important point : all the sashes on each side should be hung at the top, and open outwards to admit air. The roof ventilation should be on both sides of the ridge and open by means of

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simultaneous lever or screw gearing. The length of the house depends so much on one's requirements, but the side wall need not be more than 18 inches high. The ridge of the house could run north and south." Personally, I would add, "or east and west," for the reason that with a house with the ridge built in this direction we have one roof facing south, which enables us in winter to obtain the maximum amount of sunlight.

In the dull winter days of England we need to construct our houses to allow the maximum of sun to enter, and at Bush Hill Park, which is situated in the low valley of the Lea, we are without sun for ten days at a stretch in winter. We have such a house, 250 feet long. It is a three-quarter span roof—that is to say the roof facing south is three-quarters the width of the house. The appearance is the only disadvantage, as the house has a somewhat lop-sided look; but this is an unimportant consideration, and the advantages are considerable. Every ray of winter sun strikes directly into the house, as there are no rafters at right angles to check its beams. The brick walls are 2 feet high; the glass sides are 3 feet high. The height from the ground to the top of the ridge is 12 feet. Some growers complain that such a house is liable to encourage the spread of red spider, and I must admit such houses are hotter in summer than when the ridges run north and south. Nevertheless, this difficulty can be overcome by extra shading, so that except in very sunny districts I recommend

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ridges running east and west. The stages might be closely boarded, of tiles or slates, or of corrugated iron covered over with ashes. The illustration will give an idea of the type of house.

The Heating Apparatus.—I will not describe this in detail. It is a question of principle, to be varied according to one's house. It would be well to bear in mind that a Carnation house should not be so short of pipes that to obtain the required temperature in cold weather the pipes have to be kept hot. To have hot pipes in the dry atmosphere necessary to Carnations in winter is conducive to red spider. Neither, on the other hand, is it desirable to have a house so furnished with hot-water piping that to keep the temperature down to the proper level (about 50°) continual and special care is necessary in stoking. Generally speaking, the piping for a Carnation house should be a flow and return under each 4-ft. or 5-ft. bench. A properly qualified fitter is always the cheapest in the end, as the details of fitting both boiler and pipes, so as to obtain the necessary rise for a good circulation of water, are of the utmost importance. Another point in heating Carnation houses is to have 3-inch or 4-inch heating pipes around the roof. This has been found by practical growers of great assistance in drying up the moisture of the house in dull and foggy weather. It assists to keep the "buoyant" atmosphere so desirable for Carnation houses, and is a plan I strongly recommend.



Fig. 11.—A Batch of 80,000 Young Perpetual Carnations.

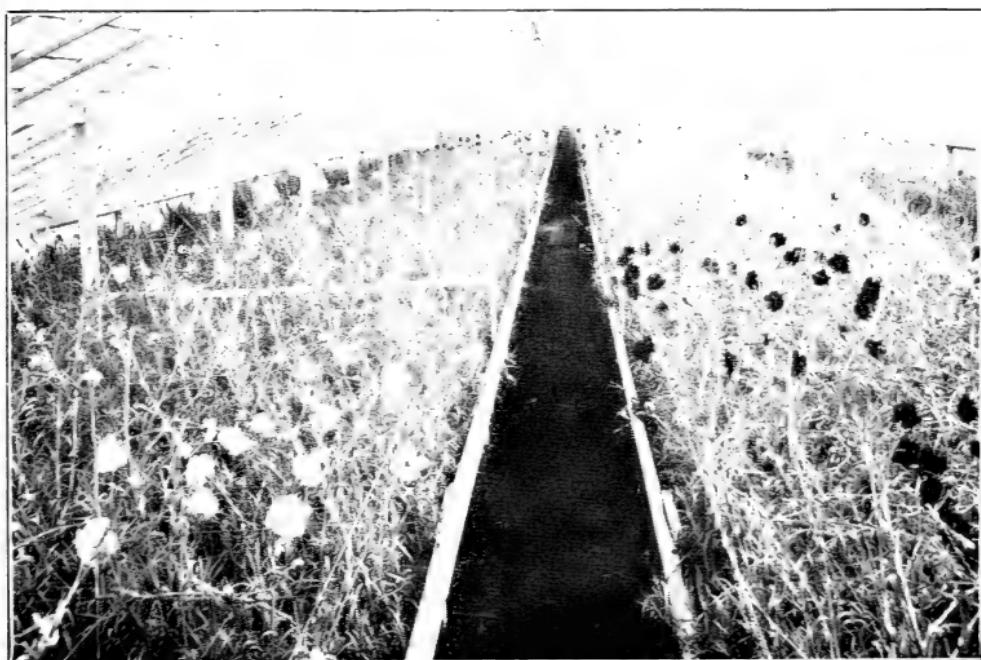


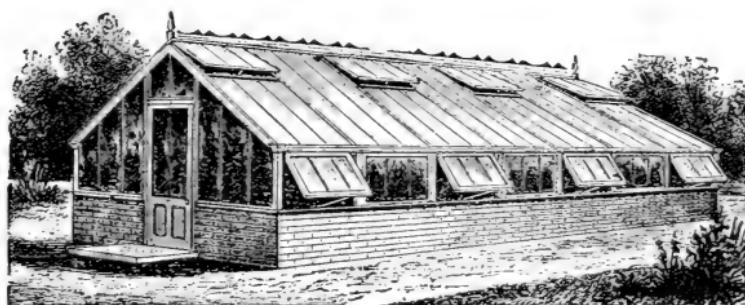
Fig. 11a.—A Modern House of Carnations.



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The positions chosen for the plants outdoors in summer should neither be in a draughty situation nor in a hot, enclosed area, but it should be fairly sunny. It is important that the plants should be stood on a suitable base that will prevent earth-worms from entering the pots. We find a good layer, say 2 inches, of cinder ash the most practical means. As I have stated elsewhere, I also advocate plunging the plants nearly to the rim of the pot. A potato planter is an excellent tool with which to make the holes. These should be made deep enough to allow a space below the bottom of the pot to ensure good drainage and to deter worms from entering. Although plunging is a somewhat laborious operation, an immense amount of work is saved later on. During hot and dry summers it is a great advantage to the plants, as it lessens the number of waterings, which in time impoverish the soil.

It is desirable in very wet seasons to have hand lights and frame lights available, as continued rain causes a sappy growth which develops rust and spot, and if very heavy is liable to kill the roots.



A Type of Carnation House

CHAPTER VIII

GROWING CARNATIONS MONTH BY MONTH

In reply to the question, which is the first month of the Carnation year, I am inclined to reply that it is January, in spite of those growers who commence to strike their cuttings in the autumn.

January.—Prepare the propagating house for cuttings; thoroughly clean it out and obtain a fresh supply of clean sand for striking the cuttings. Put in the first batch of cuttings, only taking those which are suitable, as described on page 7. For plants in flower see that the temperature does not exceed 52° during the day, with a drop of 4° to 6° at night, leaving a little air on except during foggy or unusually cold weather. Towards the end of the month stir the surface soil of the pots, giving each plant a little Carnation fertiliser.

February.—Soil should be prepared and the stock of pots increased for the needs shortly to follow. A further batch of cuttings will probably be ready to put in. See that the flowering plants are regularly disbudded. The first batch of cuttings will probably have roots half an inch long, and should be potted into 2-inch pots. Fumigate as a preventive of green-fly.

March.—This is the busy month. The main

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batch of cuttings should be in by the end of March, for cuttings are now plentiful and root more readily during this month than any other. Continue to pot previous batches of cuttings as soon as ready. The first batch of potted cuttings should be ready for a further shift into 3-inch pots, and the first stopping or pinching should be carried out as soon as the plants are 6 to 8 inches long and the roots have reached the side of the 3-inch pot. Fumigate as a preventive of green fly, even if it is not visible, as it is pretty well sure to be about. Continue to feed flowering plants, as, being in more active growth, they are better able to assimilate food than in previous months when growth was less active. Give all air possible, avoiding draughts.

April.—With the advent of sunny days, shading should be attended to, or the colour will fade from the flowers of many of the varieties. Cuttings potted this month for the first time may be placed straight into 3-inch pots. Watering should have extra care, as with the warm, sunny spells to be expected now the plants need more moisture at the root.

May.—This month finds the Carnation grower very busy. The last cuttings should preferably have been put in before this date, but should there be any yet to do see they are put in without delay and well shaded in order to keep them cool. Everything seems to need attention at once. The first batch of cuttings should be ready for a further shift into 5-inch or 6-inch pots if the second potting was done in early April.

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Continue to "stop" all young plants as soon as they are 6 inches long. Syringe the plants well during sunny weather, or red spider may soon do harm. The grower will doubtless be short of room this month, and need have no fear of placing out in cold frames any plants potted for the second or third time. I have mentioned fumigation so many times that it should not be necessary to repeat instructions for this month, but during May the plants will probably need it more than ever. One should, of course, give all air possible. During this month the houses should have the ventilators and, on sunny days, the doors wide open.

June.—Be sure no plants are "starving" for want of potting. If the young plants become hard and wiry through this cause they will never make such good progress as they might have done if grown on freely without a check. After re-potting, they may be placed directly out of doors on beds of ashes. If a temporary shelter of frame lights can be built over them to guard against excessive rains, so much the better. A large proportion of the plants should need "stopping" during this month. One-year-old plants which have been flowering during the past nine months should be cut back, and old, very hard growths be cut right out. Then re-pot the plants and place them out of doors on ashes to form fresh, well-ripened growth for flowering in the autumn. Syringe freely to ward off attacks of red spider and thrips.

July.—The work of chief importance this month

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is to get the "stopping" completed by the first week of the month. Many of the slow-growing sorts are best "stopped" in June. Only a few of the quickest growers, such as Mrs. T. M. Crook, Lady Alington, and May Day, should be "stopped" after the first week in July, or they may not bloom before Christmas. The first batch of cuttings, if they were potted into 5-inch pots, should now be given a final shift into 6-inch or 7-inch pots, and those in 3-inch pots should be put either in 5-inch or 7-inch pots by the end of the month. If there is a surplus of late-struck cuttings, pot these into 5-inch pots and keep "stopping" them until the end of September. Place them, in early September, in cold frames or pits, and they will make excellent plants for bedding out in April. Using the syringe with force during the hot days of the month is of utmost importance, for in July red spider usually appears. The use of salt in the water (see p. 85) for syringing is of assistance in getting rid of it. Continue to feed well-rooted plants each week until the end of September. Stake plants that are growing freely.

August.—This month should find most of the work completed, and plants wanted to flower before Christmas should not be "stopped" further. Any shoots running up to flower should be broken out at the sixth joint. Few people require blooms in September. Old plants which are two years old are best thrown away to make room for new stock with more vigour. Thoroughly clean the houses, and either

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repaint or wash the rafters ready for the housing at the end of the month. Old plants which have not been re-potted are best top-dressed with a mixture of half Carnation fertiliser and half soil. We strongly advocate housing early ; most of our plants are under glass by the end of the month. As soon as they are in, fumigate for thrips, which otherwise often spoil the early flowers. Continue to keep the plants tied, or fix the patent plant supports in position so that all growths are kept straight.

September.—No plants should be outside after the first week of this month. If weeds are in evidence, see that they are removed from the surface of the soil. Clean all glass, for there should be no shade on the houses at this date. Even the hot days which we often experience this month are beneficial to the plants, as they help to ripen the growths and enable them to withstand the dull weather later on. Continue to feed the plants until the end of this month. If there are any signs of thrips, which may be recognised by deformed tips of growths or misshapen buds, fumigate weekly until the pest is cleared out.

October.—When the nights begin to get cold and wet a little warmth in the pipes will help to dispel moisture. Ventilation again becomes a factor of importance this month. Give all the air possible, and have sufficient warmth in the pipes to keep the temperature, with the ventilators slightly opened at night, at about 50° Fahrenheit. Many growers commence to strike cuttings this month, but I am no

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advocate for very early rooted plants. We produce as good plants from cuttings struck after the turn of the year as from those rooted in October. The pleasures of Carnation-growing commence in earnest with the opening of the first blooms, and the interest in watching the first flower of a new variety well compensates for the extra shilling spent on the plant. Should any flowers open with a splash, usually white, or of a pale colour, in the petals, depend upon it thrips are at their nefarious work. Stamp them out with fumigation once a week, or many of the best blooms will be spoilt.

November.—We never syringe at this period of the year; the moisture remains on the foliage so long and encourages rust. The plants should now be producing flowers freely, and in spite of fogs, which are prevalent during this month, one ought to have a good display. Temperature and ventilation are, of course, all important. The blooms for Christmas should now be showing signs of appearance, and buds that are rather larger than peas at the end of November will be the Christmas blooms. Do not be impatient, however; to try and force them is to spoil them. Careful watering is of great importance: only those plants should be watered that are rather dry and of which the pots “ring” when rapped with the knuckles.

December.—Do not increase the temperature in the desire for Christmas blooms. I have seen many plants spoilt by this. This is an anxious time, for while with mild weather one may obtain plenty of

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bloom, the chances are that the dull, short days of November and December are telling on the plants, and weak stems may make one wonder if correct treatment is being given. But do not be dismayed, these symptoms are normal, and the system of cultivation may be continued in the knowledge that other growers are going through the same trials. In dull weather allow the temperature to drop a few degrees, but not below 45° at night, with a rise of 3° or 4° in the day-time, always affording a little air to dispel the moisture and to keep the atmosphere "buoyant." Another batch of cuttings may be put in, but if the correct ones are not available one would do better to wait a few weeks until they are ready.

CHAPTER IX

SOILS AND MANURES

THE consideration of soils for Carnations causes many an anxious thought to beginners ; but really the Carnation is not so punctilious in this respect as many other plants, for either of the two extremes in soil—the light, sandy and the heavy, clayey soil—can be treated so that they will grow Carnations successfully. The ideal and natural soil should, of course, be of a sandy, loamy nature, which, when squeezed between the fingers (being neither wet nor dry), should be somewhat greasy, but containing particles of sand. The best soil is obtained by chopping turf sods that have been stacked some months (preferably half a year). The actual composts for potting are dealt with in another chapter, so we will consider the subject of unsuitable soil.

Sandy Soils.—Sandy soils, whether to be used as potting compost or for growing Perpetual Flowering Carnations out of doors, are, of course, always improved by additions in the shape of heavier soil well dug in, and any moisture-retaining substance, such as leaf mould. Cow manure is almost essential for a sandy soil, whether it be used as a potting compost or for beds in the open. I would also remind those who think that their soil is too light for Carnations that the

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district of Bournemouth includes an area of soil most unsuitable for Carnations, it being either sand or peat. Yet because the district is sunny, and cultivators improve their soil by the addition of heavier loam, some of the finest Carnations are produced there.

Clay Soils.—Clay soils are really the most troublesome, and often cause more work than any other ; but I have seen the most stubborn and heaviest clays negotiated successfully. Heavy soils should be well dug in autumn with a dressing (6 inches deep) of sand or road scrapings together with decayed leaves. The newly turned soil, being left exposed to the frosts, will be further broken up. Burnt clay is also an excellent means of lightening soils of this nature, and if sufficient burnt garden refuse is not available the process of burning the clay can be carried out.

How to Burn Clay.—Collect a large heap of burning material, preferably wood ; there should be sufficient to obtain a large body of fire, and the heap should not be less than $1\frac{1}{2}$ yards high by the same in diameter. When half consumed, cover with a layer of clay 6 inches thick, then add a sprinkling, say $\frac{1}{4}$ inch thick, of coal slack and a further 6 inches of clay. Allow the heap to burn for some time, and as soon as smoke percolates through the outer covering repeat the sprinkling of coal slack and a layer of clay, and so on until the amount of burnt earth required is obtained. Throughout the operation the centre of the heap should be kept open to form a

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flue for the burning mass. For the purpose of good combustion this is essential.

Proving the Presence of Lime.—Lime, either slaked or in the form of chalk, is one of the best means to lighten heavy soil, besides forming an excellent addition to soil for Carnations. On very heavy soils $\frac{1}{2}$ lb. of basic slag, dug in each square yard, is an excellent means of lightening the ground and improving it. In spring a further dressing of cinder ash, well-rotted stable manure, or leaf mould should bring the soil into good condition. An excellent and simple means of proving the presence of lime in one's soil is to take a sample from several different places and well mix together. Then, taking rather less than half a pint—say half a tumblerful—of soil, spread it out on a tray and pour a wineglassful of spirits of salts over it. If, when soaking into the soil, the liquid effervesces, then one may rest assured the much-desired lime is present. Failing this sign, however, add chalk or lime as advised above.

Manures.—We now come to manures, which, either applied as a top dressing or in liquid form, but principally used in the soil, are essential to the production of the finest blooms, and in some soils any sort of bloom at all. We manure to obtain healthy, vigorous plants able to carry large flowers of deep colour on stiff stems. Farmyard manure is excellent for general purposes, but to use this freely for Carnations is to cause a too sappy and soft growth. Farmyard or stable manure is a good addition to heavy soils, just

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as cow manure is desirable for light soils; but Carnations need a fertiliser containing ingredients of a slower and more hardening nature. To obtain stiff stems and depth of colour, such as are seen at exhibitions, Carnations need more phosphates and potash than are found in the otherwise excellent ordinary farmyard manure, which includes, of course, sheep, pig, horse, cow, or fowl manures.

There are many Carnation fertilisers to be obtained. Low's Carnation Fertiliser is an inexpensive manure containing the necessary proportions of food for Carnations. It is not made for any and every plant, and true as the old saying is that "one man's meat is another man's poison," it is more certain still that a fertiliser for ferns, palms, etc., i.e. one to produce leaf and growth, will not suit the Carnation. Fertilisers should only be mixed with the compost at the final potting or with the soil in the outside border. In the months of November and December Carnations, if not actually at rest, are in the period when they are normally resting. They need little fertiliser in these months; in fact, harm may be done by stimulating them and causing a soft and sappy growth.

Supposing that the plants are in full growth with pots full of roots, a good rule by which to apply Carnation fertiliser would be to feed once or twice in January and February, two or three times in March, and once a week afterwards to all flowering plants (except those recently potted), with alternate waterings of soot water, which is best obtained

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by placing a sack of soot in a tub of water and filling the can from this. Soot water is always useful in the Carnation house, and a permanent bag in the water-tank is of great service. Do not feed if the plants are sickly through any cause, especially through over-watering, or when they are soft through being cultivated in a sunless house, with too close an atmosphere, and never feed unless roots are both plentiful and vigorous. Feed when the plants are in active growth and flowering freely, that the flowers may be improved and the general strength of plant maintained.

Sterilising Soil.—The safest and most effective way to destroy wire-worm and such pests of the ground is to sterilise the soil. This operation is not absolutely necessary when the soil is for potting Carnations, provided it is not badly affected and, above all, that one does not mind losing a few plants. To illustrate my meaning, we will suppose that 100 plants are grown; unless the soil is really badly infested, there will probably be not more than about five wire-worms in the 100 pots. The wire-worms will attack these five plants and kill them, but they cannot harm other plants in separate pots. On the other hand, when one is planting out on benches, it is of the utmost importance to see that the soil is cleared of this scourge, and I will briefly describe a good system of sterilising, which might be applied to infected soil used for cucumbers and other plants which are attacked by soil pests.

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A steam boiler must be used to obtain the necessary pressure of steam. Construct a wooden trough, 2 ft. deep, long and broad enough to contain sufficient soil convenient to sterilise at one operation. Use 1-inch pipes, 1 foot shorter than the trough is long; drill holes of $\frac{1}{8}$ -inch diameter throughout the length of the pipes at intervals of about 6 to 8 inches, and connect the lengths of pipes to a flow **T**-cross pipe of about 2 inches in diameter coming from the boiler. It is important to connect these pipes with the flow in such a way that the holes point out sideways and not upwards, the idea being to force the steam in sideways through the soil instead of directly upwards, as it would then lose a lot of its power on the soil. The pipes should be at the bottom of the wooden troughs, so that the ascending steam will penetrate the body of soil to be sterilised. When the trough is filled with soil, turn on steam, allowing this to work through the soil for about thirty minutes. The boiler should have sufficient pressure to cause the temperature of the soil to rise to just above 200°, which is sufficient for the work of sterilisation.

CHAPTER X

THE DECORATIVE VALUE OF CARNATIONS AND HOW TO EXHIBIT THEM

(WITH A SELECTION OF THE BEST VARIETIES OF PER-
PETUAL FLOWERING CARNATIONS)

THE decorative value of Carnations! No flower combines to such extent the qualities of (1) long life, (2) grace, (3) ease of arrangement, (4) variety of colour. It seems superfluous to enlarge on the value of the Carnation for decoration and exhibition, for the great variety of colour is the decorator's only pitfall; but in this respect merely the inexperienced will fall. Only the person of little taste would mix the Rose Pink Enchantress shade with a scarlet, or a salmon-red with a purple! In that excellent work, "British Floral Decoration," by Mr. Felton, the author gives first place to Carnations for decorative use. Here are some of Mr. Felton's combinations, which, as an exhibitor of the Perpetual Flowering Carnation since it first came to this country, I can heartily endorse. His association of yellow and purple are most striking, and I have found these to be most attractive combinations: "Royal Purple and J. W. Riley (yellow) make a bold contrast, using the former colour as a base. Royal Purple goes

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splendidly with Enchantress, Fair Maid, or May Day (all pale pink varieties). Marmion or Lady Nield and Sarah Hill or White Perfection make the most handsome table decoration it is possible to imagine. May Day contrasts perfectly with the new variety, Royal Purple, using May Day in the proportion of two-thirds, and arranging them to stand above the darker varieties. Scarlets can be mixed with nothing but whites, and I do not advise even that, as they look better alone. When using two or three varieties in one vase it is advisable to avoid, if possible, placing broken-edged and smooth-edged varieties together. They are quite distinct in type and generally of different parentage, consequently they never go well together."

The same writer says, "There is no doubt that this flower, the cultivation of which has made such rapid strides during the last ten years, is destined to occupy the highest place in the list of decorative flowers. Its merits require no writing up from me, as they are already known to every lover of flowers. Unlike the Border Carnations, these beautiful flowers are with us the whole year round, and it is difficult to imagine what we should do without them throughout the long winter months when Chrysanthemums are practically the only long-stemmed flowers that we have with us. For long journeys to the provinces or abroad they stand alone. As an illustration of this fact, I call to mind with satisfaction an order to send a large supply of flowers three times weekly to a

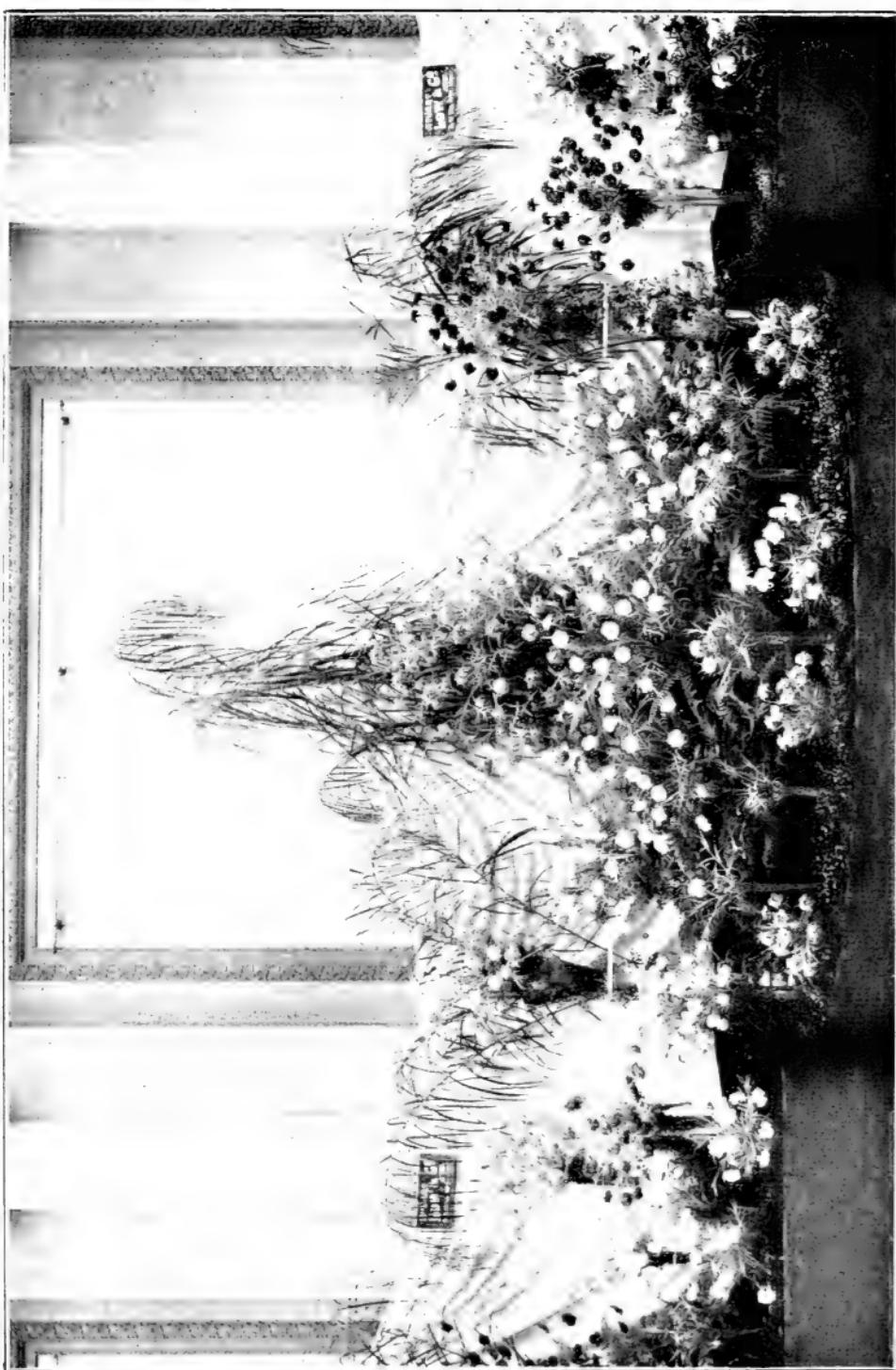


Fig. 12. A Method of Exhibiting Perpetual Carnations.



THEIR DECORATIVE VALUE

client of mine in Venice, for on her return she told me that the Carnations always reached her in perfect condition and lasted many days after their arrival. I have also sent them to Davos Platz and St. Moritz (both three days' parcel post) in the depth of winter, with the same satisfactory result."

Carnations for decoration are principally employed for table work, and here the rose pink and salmon shades undoubtedly excel, as they show up so well by artificial light. Anyone having seen the glowing colour of Begonia Gloire de Lorraine under artificial light cannot fail to have been impressed by this colour for decoration by night, and the nearest colour in Carnations to this flower is found in the variety Lady Alington, which, by the way, is almost identical with the colour of Lady Hermione, the border Carnation chosen by Her Majesty Queen Mary for her Coronation bouquet. It is somewhat unfortunate that while, on the one hand, Carnation Lady Alington possesses one of the finest constitutions, the variety Lady Hermione is discarded by many on account of its weak and unhealthy habit of growth.

Carnations for Exhibition.—At flower shows, Carnations exceed in value almost all other flowers for precisely the same reason as in other floral work, and their lasting qualities enable exhibitors to take them long distances with ease. I have taken flowers from London into the heart of Germany, to such places as Dresden and Mannheim, and exhibited them there two or three days, and at the end of that

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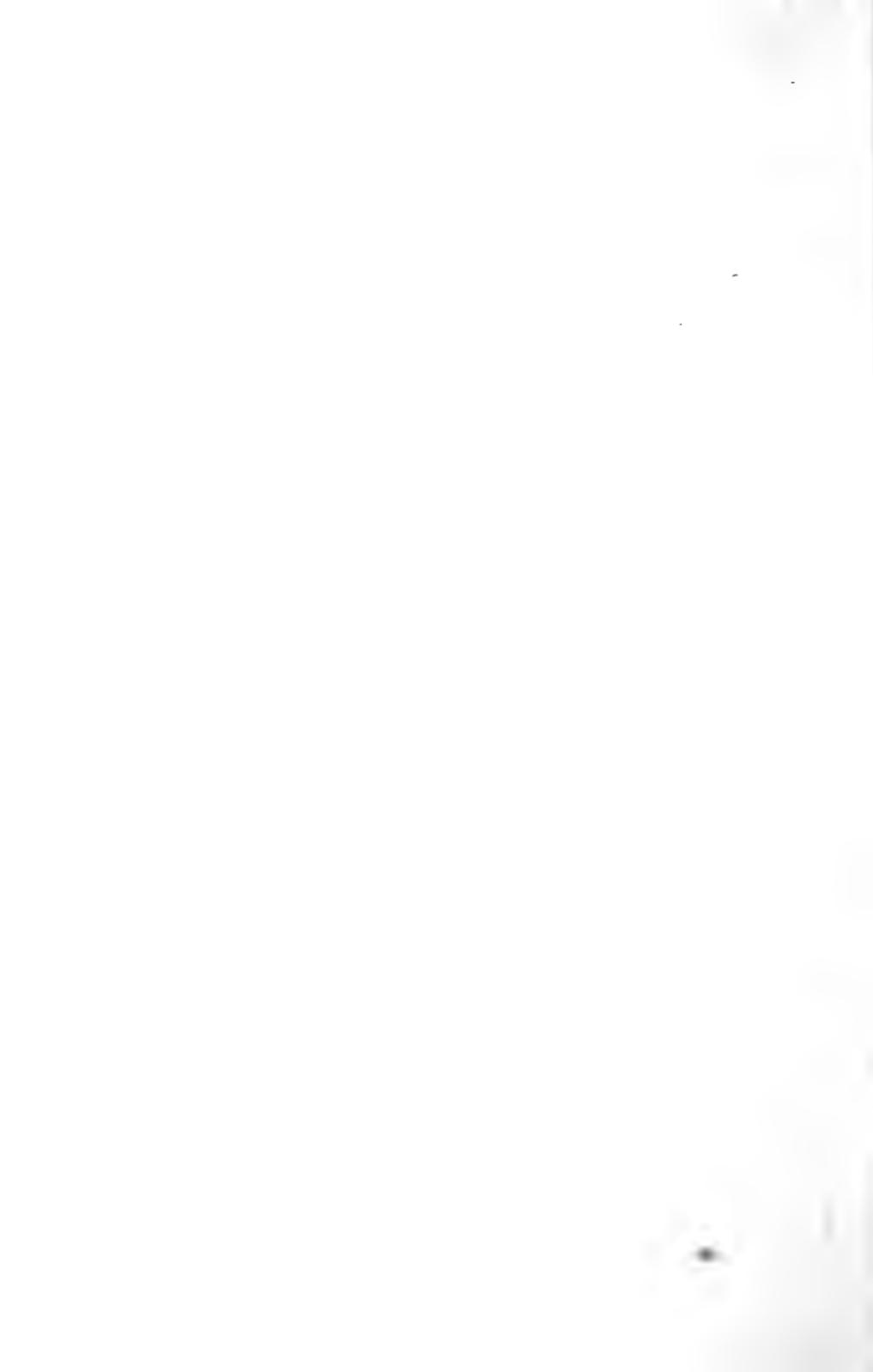
time they have been still comparatively fresh. In arranging flowers at exhibitions, do not overcrowd the blooms. Display them with their own foliage, if possible, and if this is not available use some other suitable green, as *Asparagus Sprengeri* or *Nephrolepis* fronds. The blooms look well when set up in tall vases placed at the back with shorter ones in front and a row of Carnations arranged in bowls in the front row.

White flowers are invaluable for giving a light effect to the group. Keep the reds together, preferably at the end of the group, and divide these by vases of whites from the various shades of pink, placing the lighter pinks between the rose and cerise varieties. Keep the shades of purple and mauve, of which we now have several, by themselves; either white or yellow varieties are again most useful to separate the latter from the pinks, many shades of which would otherwise clash with them.

There are various ways of arranging a group for exhibition. The usual method at flower shows is to have straight tables; but we have found, when possible, a round table set out in a similar fashion to the illustration on the frontispiece to be the most effective. Always aim at a light effect. Gone are the days when Carnations, held with stiff wires or sticks, were packed in masses like a company of soldiers standing at attention. Arranging the flowers in bamboo stands, by which they can be fixed in one direction, the blooms being cut with stems of various length, helps to give this light effect, and if plenty of flowers



Fig. 13.—Type of Flower with Serrated Petals—"Baroness de Brien."



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are available, baskets suspended over the group on iron stands, painted white or palest blue, are very striking. When commencing to arrange a group, first consider the colours, so that they do not clash, then aim at a light effect. Those who can set up a group to look well are artists. The arrangement of a group of Carnations is as characteristic of the arranger as his handwriting, and is as easily recognised.

THE BEST PERPETUAL FLOWERING CARNATIONS

*The most fragrant varieties are marked *. Those marked thus, †, have not yet been thoroughly tested. Those marked (A) are American, and (B) are British varieties.*

PINK

Admiration (A).—A beautiful shade of rosy flesh pink, with a good satin finish. The flowers are of the same size as Enchantress, to which variety it is closely allied. It is, however, of greatly superior form and the colour does not fade. “Stop” at the end of June or early in July.

† **Baroness de Brienens** (B).—The largest of all Perpetual Carnations. The flowers, which are a true shade of salmon flesh pink, attain upwards of 4 inches in diameter, and remind one of a Malmaison in point of size. The stems are somewhat short and thick, an advantage with a flower of this size and weight. The plant is a strong grower, with broad foliage, and makes such a fine plant that only one “stop” is required. We “stop” this variety early in June, only

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breaking out any flower stems that would flower before October, and from this one "stop" an excellent plant is obtained. It should be rooted not later than March, but preferably earlier.

† **Bright Spot** (A).—A clear shade of dark pink. Flowers of medium size. A very free-growing and free-flowering variety, with strong stem and calyx.

Colossus (B).—A deep shade of rose cerise. This is one of the largest-flowered varieties in cultivation ; the calyx is very strong and sound, this being exceptional for so massive a flower. The habit of growth and formation of flower are similar to Enchantress, to which variety it is closely related. It is slightly scented. "Stop" in June.

Dorothy Gordon (A).—A seedling closely resembling Rose Pink Enchantress, except that it is a shade darker in colour. It makes a larger plant and produces more flowers than this variety, to which it is superior. "Stop" early in July.

Enchantress (A).—The old standard favourite, which, for a Carnation, has already had a long life. The colour is delicate flesh pink. It is easy to grow, the habit of growth being almost perfect. A variety of the first quality. "Stop" early in July.

† **Gloriosa** (A).—A soft shade of pure pink ; the flowers are of good form, with full, high centres, good stems and calyx. A quick, healthy grower which commences to flower early in the season and is continuous blooming. "Stop" until the middle of July.

* **Lady Alington** (B).—This I believe to be one

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of the finest varieties ever raised. The colour is a delightful shade of rich old-rose salmon, glorious under artificial light. The flowers are very large and full in the centre, and the stem is of good length. In growth it is one of the quickest of all Perpetuals, exceptionally so in making fresh shoots after each crop has been cut. This is the sweetest-scented of any existing Perpetual Carnation and is a favourite variety. We are proud of being the raisers of this. "Stop" until the middle of July.

May Day (A).—An exquisitely formed Carnation, with shell-shaped petals, of salmon shade with a satin finish. Most pleasing and refined. The growth is wonderfully free; one of the best varieties of recent years.

* **Mrs. H. Burnett** (B).—A delightful shade of salmon pink. Of good form and medium size, with a strong, rich, clove fragrance. Uncommonly easy to grow. "Stop" the end of June or early in July.

R. F. Felton (B).—A lovely shade of soft rose pink. The flowers are large, with good calyx; the growth of the plant is strong and free. "Stop" the end of June.

Rose Doré (B).—Can be described as salmon red; of not sufficient strength of colour to be classified as a red. The flowers are very full, borne upon long stiff stems. "Stop" early in July.

Rose Pink Enchantress (A).—One of the many "sports" from Enchantress. It is of perfect rose-pink shade. The habit of growth is identical with that of Enchantress. "Stop" early in July.

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Winsor (A).—A delicate shade of silvery pink, a strong and free grower. The flowers have a rather rough appearance, but are of excellent substance. "Stop" early in July or the middle of the month.

WHITE

* **Marchioness of Linlithgow** (B).—The purest of whites. The flowers are not large, but compact and very evenly fringed. This undoubtedly is the freest flowering white variety; the growth is not robust, but wonderfully free, much shorter than White Perfection, one of its parents. It is also fragrant. "Stop" early in July.

White Enchantress (A).—A "sport" from the famous flesh-pink variety Enchantress, with which it is identical in habit of growth. A good all-round white. "Stop" early in July.

White Perfection (A).—Purest white blooms of model build and of good depth. It is strongly perfumed, with non-splitting calyx and long stems. "Stop" at the middle of July.

† **White Wonder** (A).—This variety is sent out as an improved White Perfection, but the flowers are larger, with better stem and calyx. White Wonder makes a larger plant, which produces more flowers. "Stop" middle of July.

CRIMSON

* **Carola** (B).—Dark crimson. Almost as large as a Malmaison. It is inclined to split, but is very



Fig. 14.—Type of Flower with Smooth Petals—Regal Mauve.



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bold and attractive in appearance, with a pronounced scent. Being such an immense flower, not so many are produced as in some varieties. "Stop" early in June.

Ruby (A).—Light shade of crimson, similar to the old variety Harry Fenn, but only good in this country in summer. The flowers are very large and full, with fringed petals. "Stop" the end of June.

Triumph (B). A beautiful flower of real Old Clove colour, medium size, free blooming for a crimson, and an excellent grower. The best crimson. "Stop" at the end of June.

Wanoka (A).—A good free-flowering, light crimson variety. A healthy variety, easy to grow. One of the best all-round crimsons, better in winter than in summer. "Stop" the end of June.

RED

Beacon (A).—Light orange scarlet. The flowers are loosely built, of medium size, and exceedingly productive. "Stop" early in July.

Britannia (B).—Light crimson scarlet, a rich colour. The flowers are deep and of loose build, with clean-cut smooth-edged petals. The calyx is always reliable. The habit of growth is robust and free. "Stop" the end of June.

Rival (B).—A new shade of colour, deep coral red. The flower is large, with good guard petals and high, well-built centre. The habit of growth, stem, and calyx are excellent. It grows freely. "Stop" early in July.

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Scarlet Glow (A).—I consider this variety the best of its colour. It is of an exceptionally bright shade of red, which never becomes dull. The well-rounded flowers are of medium size and of great lasting capacity. The habit of growth is very similar to that of Beacon. “Stop” early in July.

YELLOW

Fortuna (B).—Pale chrome yellow. The flowers are not large, but the habit of growth is strong and free—a decided acquisition to this class of colour. I do not include J. W. Riley, as this variety has not proved satisfactory.

FANCY

Fire Glow (B).—Bright yellow ground, flaked with red. A great improvement on that striking variety Oriflamme. “Stop” the end of June.

Helen M. Gould (A).—This is a “sport” from Enchantress, to which it is similar in point of growth. The flowers are of clear rose colour, spotted with a deeper shade, giving a very pleasing effect. “Stop” early in July.

Mikado (B).—A unique shade, glistening heliotrope. The flowers are large, with full centres, and are borne upon strong, wiry stems. This is a most popular variety. “Stop” end of June.

* **Mrs. T. M. Crook** (B).—This is one of the most distinct and beautiful of all fancy varieties, having a ground colour of pale crimson, heavily veiled with a profusion of rich crimson, giving a very bright and

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attractive appearance. The flowers are made up of large flat petals, with a very full scent. The most free-flowering of all varieties. The stems are long and strong, and the calyx does not split. Being such a free-flowering variety, it should be "stopped" as late as the end of July, or even August.

* **Regal Mauve** (B).—A seedling from Mauvina and White Perfection. It combines the large flowers of the latter variety with the colour of the former, giving that distinct shade of mauve that is so popular. "Stop" end of June.

Royal Purple (B).—As its name denotes, this is of a rich shade of purple, a most popular variety. Its colour shade is new to this class of Carnation, and forms a delightful contrast to other colours, especially under artificial light, where it is seen to great advantage. The habit of growth is of the freest and best, producing great quantities of bloom. A variety to be strongly recommended. Stop at the end of June.

A list of discarded varieties is given at the end of the book.

CHAPTER XI

CARNATIONS FOR PLEASURE AND PROFIT

THIS is said to be an age of luxury, distinguished by a love of ease and pleasure. Whether this is true or not, I am acquainted with quite a number of men whose business so encroaches on their leisure that amusement or relaxation comes in time to lose attraction. However, I am acquainted with a greater number who would have reached that unenviable condition but for the solace and pleasure of their gardens and greenhouses. Only the lover of his garden is able fully to appreciate the charm of June days, when the Roses and Sweet Peas are opening. Then the busy man, but true lover of his garden, will realise that, after all, "gardening is the purest of human pleasures, the greatest refreshment to the spirit of man." The dainty woman, when gathering flowers for her own person or the adornment of her house, knows that she is enjoying the earth's best, and she rejoices because one seldom realises this in the world's pleasures. The delights of the rushing motor-car only give desire for more speed; the pleasures of swimming or of rowing are quickly followed by fatigue; and the enjoyment of rest does not last long before being displaced by restlessness. The enjoyment of our garden, however, never bores.

FOR PLEASURE AND PROFIT

Summer quickly passes to autumn and autumn to winter; then comes the turn of the man with his house of Carnations. No other plants give such a return for the pains bestowed upon them. While the Chrysanthemum grower is making the most of his short season, the devotee of the Carnation is realising that his harvest of bloom is only beginning. He gathers the first vase of blooms in October, and throughout the dull days of November and early in December cuts sparingly, knowing full well that blooms left uncut should be still fresh for the big bunches needed at Christmas-tide. The blooms open more slowly in the sunless, short days of January, but they are cherished all the more for that, and with the longer days of February more delights are in store for the grower in the stiffening flower stems, the deeper colour of the blooms and renewed vigour of the plants. When winter has passed to spring, the Carnations (if not needed for another season under glass) are returned to the open border, and there will continue to bloom throughout the summer.

From growing Carnations for pleasure, many are led to attempt growing them for profit. Some can combine the two, but those who wish to taste the profits must be prepared to sacrifice some of the pleasure, for even a professional will regret parting with his best plants. Amateurs are inclined to think that Carnation growing must be profitable on learning that the florist sells blooms at so much per dozen. They imagine the grower must be making a fortune.

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" Each plant should produce nearly a dozen flowers, and at this price they must pay well," they say. Yes; but the cost of production must not be overlooked. A plant to produce twelve blooms (eight or nine is nearer the average) must be a good one, and to obtain a good plant one must buy good stock or take only selected cuttings. There must be expert men to care for them, and one must have plenty of room in which to grow and flower the plants. Any attempt to cultivate a greater number than one can easily accommodate usually ends in disaster to the lot. The profits from growing Carnations for cut flowers are, however, by no means visionary, and until their cultivation becomes overdone, as so many things are, a living is to be made by those who, following on business lines, grow their plants well and market them wisely.

Selling the Flowers.—By marketing them I do not mean to dump them into Covent Garden. This is the first action of many, with the result that the market is often glutted with blooms. Rather select a market in your own locality, so that the local florist, depending on you, finds your goods fresher, and consequently more profitable for himself than those from a distance.

The best time to cut one's flowers is in the early hours of the morning for dispatching in the afternoon or at night. For dispatch in the morning the blooms should be cut overnight. It should not be forgotten that flowers should be cut and placed in water for at

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least six or eight hours before being despatched on a journey. A cool shed or cellar to store the blooms in is indispensable, and should form part of the equipment of everyone going in for Carnations for profit.

It would, of course, be most unwise for anyone to commence growing Carnations commercially without either previous experience or undertaking experiments with a view to finding out his capacity to grow them. Assuming that one can successfully cultivate them, the difference between profit and loss is one's ability to do everything well and thoroughly, combined with economy. "Who aimeth at the sky shoots higher much than he who means a tree" is an old adage that is particularly applicable to the grower of Carnations. Aim to produce high-grade blooms ; these always command a first sale, and are in the end the most profitable. No wise amateur will overcrowd his plants, neither will the commercially wise, for overcrowding undoubtedly spells second-rate blooms and fewer of them !

Having selected your market, it is all important to pack well, whether you elect to bunch the flowers or place them loosely in boxes. Let the blooms be so placed in the boxes that they look smart when opened, and see that the box is well lined with clean paper, preferably white, or some colour that does not clash with the blooms. We lay the blooms on rolls of paper ; these form pillows on which the flowers so rest that the petals do not become crushed or bent. After the last

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row of blooms is placed in the box secure the whole by a stick fixed firmly from one side of the box to the other. For sending on long journeys we tie the stems by means of string passing through two holes in the bottom of the box.

A convenient size of box is one that holds twenty-four flowers packed with long stems.

CHAPTER XII

CARNATION DIFFICULTIES, PESTS AND DISEASES, WITH THEIR REMEDIES

PLEASE do not misunderstand me. These are not commoner to Carnations than to other plants, but since I am doing my utmost to give the details of cultivation in a most practical way, this work would be incomplete without the inclusion of such a chapter as this.

One gets tired of hearing people say, "My gardener is no good at growing so and so" (not necessarily Carnations). But often the gardener's first difficulty is that of obeying two masters—his common sense and experience, and the master who employs him. Often enough he finds it impossible to reconcile the instructions of the latter with the promptings of the former. "A little knowledge is a dangerous thing," especially when put into practice at odd and convenient times to the garden owner, but often very unsatisfactory to the plants. My advice, then, in this, the first difficulty, is to allow the gardener full control. Even if he is not an expert at Carnation growing, his common sense and general knowledge of flower growing concentrated on one subject will invariably ensure better results than the casual application of a cleverer mind.

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When considering "difficulties," the first thought that comes to one is "What are the chief?" One realises that the principal difficulty of one grower would, perhaps, not be that of another. For instance, some have to contend with an unsuitable house, perhaps not facing the right aspect (south), possibly overshadowed by trees; and in connection with the difficulties of a suitable house may be classed that of growing the Perpetual Flowering Carnation in the same house as other plants. It may be grown quite successfully with some things, such as Mignonette, Schizanthus, and similar plants, but not with those plants that require a closed ventilator at any time. Others are greatly handicapped in a district where the atmosphere is murky throughout the greater part of the winter, and I am not sure that this is not one of the chief difficulties a grower in this country has to contend with.

Near the large towns there are hundreds of lovers of the Carnation who are excellent growers, but whose difficulty lies in attending the plants successfully in the dull days of winter, when, week in and week out, the life-giving rays of the sun are scarcely visible. Under these conditions, of course, really good blooms are not possible, and we must wait for the finer days. To counteract the loss of sun we must keep the plants as dormant and grow them as hardily as possible. Plenty of air and a temperature of 45° will find the plants in better condition to bring into flower in early spring than if a warmer atmosphere were

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maintained, causing the plants to make soft, useless growth.

Red Spider.—Red spider is an enemy to most plants, and its ravages are recognised by little white spots and markings under the leaf. It punctures the skin, causing it to turn grey and brown, and shortly to wither and die. This tiresome little insect loves the Carnation, and, given ideal conditions, it quickly multiplies. The utmost care must be taken to guard against its attacks. Syringing with force night and morning in hot weather does much good. Prevention is better than cure, for the red spider will quickly ruin both the appearance and health of the plants. Fortunately, we have a cheap remedy in common salt, not table salt, diluted with water—1 oz. dissolved in 2 gallons of water, well stirred and syringed under the leaves with pressure. This solution will spoil the flowers if sprayed upon them. Red spider appears chiefly in summer, and although the remedy would appear so simple, only thoroughly carrying out the syringing operations will keep the spider down once it has appeared. Should this pest come in winter, when syringing is not advisable, make a paste of 3 lb. of quicklime and 1 lb. of flowers of sulphur. Add sufficient water to make a thick solution, thoroughly mix, and paint on the hot-water pipes, covering about one-half of the heating surface by painting in lengths of, say, every alternate 4 to 6 feet. Another effective means is to use sulphate of potassium, 1 oz.; soft soap, 2 oz.; and paraffin, $\frac{1}{2}$

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wineglassful, made into an emulsion, thoroughly mixed and dissolved in 2 gallons of soft water. Dip the plants in this and stand on their sides to drain.

Thrips.—Thrips, another insect common to most plants, is a real plague to the Carnation grower. At the fall of the year, especially after hot weather, thrips have to be contended with, and unless kept in check these minute creatures will spoil a whole crop of blooms. They are all too soon recognised by the blooms opening with a crippled appearance, or by the flowers showing a speck of another colour usually on the edge of the petals. Thrips flourish under dry conditions in the same way as red spider, and woe betide the grower in the neighbourhood of ripening hay or corn.

As a preventive, syringe the plants forcibly during dry weather. As a remedy, when once thrips have gained a footing on plants outside, use 1 oz. of salt to 2 gals. of water. Syringe the plants with this once a fortnight, and the intervening week with a solution of Paris green and $\frac{1}{2}$ oz. of sugar per gallon of water. Under glass we are able to cope with thrips much more readily by fumigation, and as this insect increases so quickly and hides itself deep down in the bud, it is well to fumigate twice or three times at intervals of two or three days. We use both Richard's X L All and Bull's Vaporiser, both being excellent fumigators. Fumigation should be done on days when there is little wind, usually in the evening. Let the temperature of the house fall to cause the atmosphere to

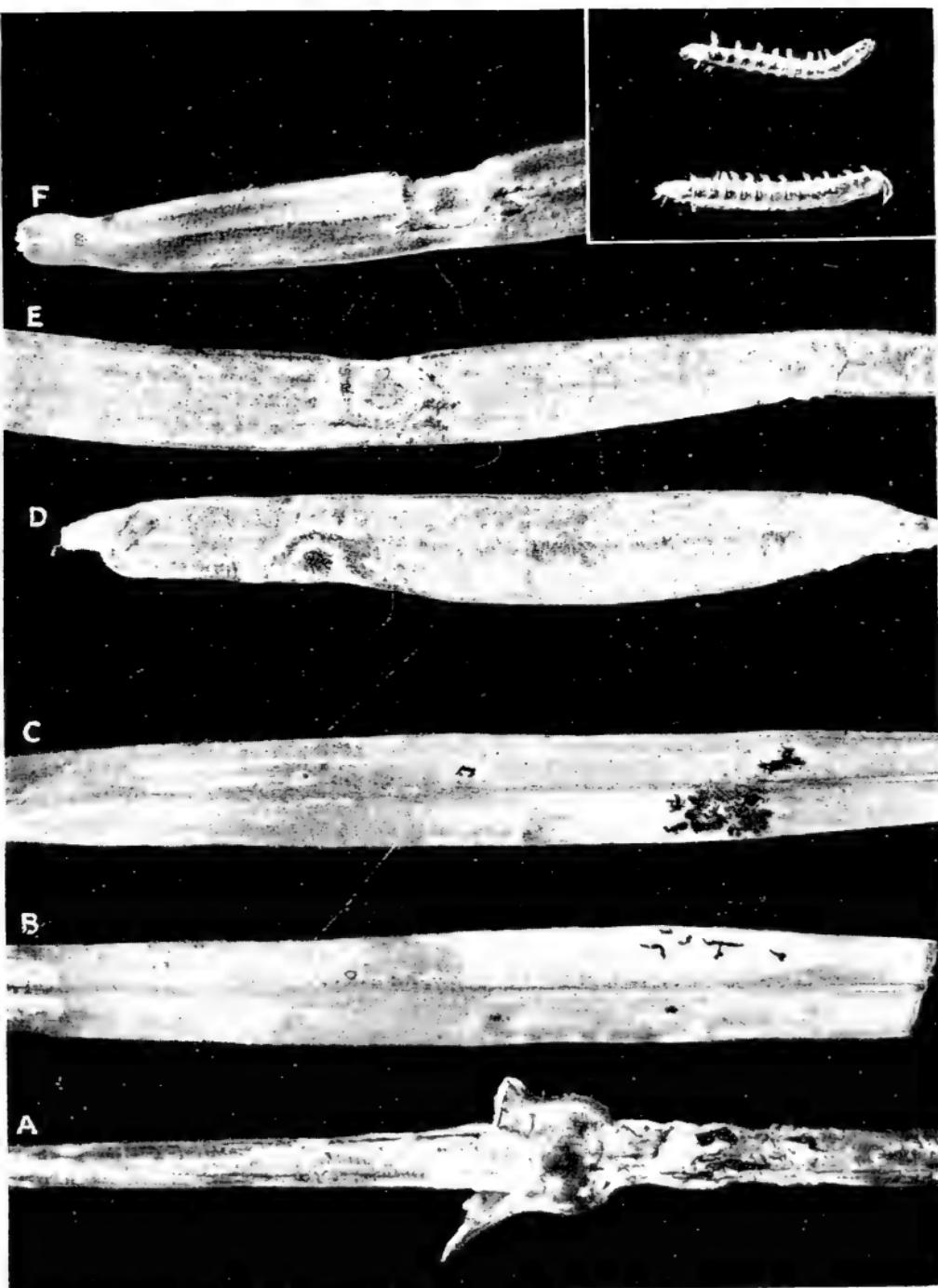


Fig. 15.—Pests and Diseases.

The small illustration is of Wire-Worm. A, B and C show Carnation Rust; D, E and F show Carnation Spot.



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be as little "buoyant" as possible. Let the plants be on the dry side when carrying out this operation, and do not fumigate when the sun is up.

Green Fly.—Green fly does more damage in a short time to Carnations than to any other plant with which I am acquainted. This common little insect is too well known to need describing, and should be destroyed immediately any sign of it appears. Green fly develops in the top young growths of the plants and punctures the leaves. As the plant grows, these punctures often develop disease, hence the special danger from green fly, which is easily killed by fumigation, as described for thrips. Tobacco dust is also a good remedy; so, too, is an emulsion of quassia chips 1 lb., soft soap 1 lb., boiled for three hours in soft water. Add an equal quantity of soft water. Spray the plants while the water is hot.

Wire-worm.—Wire-worm is the next worst enemy of Carnations. It has in the past been the *bête noire* of Border Carnations; but since the Perpetual varieties are now ousting the Borders, and also since so many growers plant their Perpetuals out of doors during summer, it has to be reckoned with. Wire-worm infests the soil. It attacks the roots and stems of the plants, and quickly kills them.

Sterilising the soil to clear it of wire-worm is described in the chapter on "Soils and Manures."

In the open border a heavy dressing of lime and soot keeps it in check, and large numbers may be

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caught in traps consisting of pieces of potato or parsnip just buried in the soil.

Eel-worm.—Eel-worm is yet one more pest that sometimes infests soils. It is a minute red or grey worm-like creature which lives in the roots and underneath the stems of the plants. Prevention is the only way of dealing with it, and, should the soil be infected, sterilise as recommended for wire-worm.

Ants.—Ants do indirect damage by carrying green fly. For years we had no real remedy, but now we use Ballikinrain Ant Destroyer, which can be obtained of any local nurseryman or from the manufacturers, Messrs. Alex. Cross and Co., Glasgow. We find this quite exterminates them, as, unlike many remedies, which merely kill the working ants, Ballikinrain is taken home to the queen ant, and so the source of all the trouble is wiped out.

Earwigs.—Earwigs sometimes eat the foliage and flower-buds, and the best remedy is the old cottage garden system of using inverted flower pots with dry leaves or hay. Another excellent trap is made of hollow bamboo or Sunflower stems, in which the earwigs congregate and may be captured.

Rabbits.—Rabbits will do speedy and immense damage to plants outside, and if this little animal is in the neighbourhood, he will find the plants, which should be well protected with wirework, or in a single night one rabbit will spoil a whole bed.

My catalogue of "Pests and Diseases" seems to record a long list of troubles, but I aim at giving a

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complete list of what Carnations might suffer from. There need be no fear of disease in Carnations if only care is taken to give the plants plenty of fresh air and sunlight.

Rust.—Rust is the commonest disease of Carnations. It is more feared by cultivators new to Carnations than by expert growers, and plants showing signs of it are destroyed by novices for fear of other plants being infected. I can only say that market growers think little of it, although, of course, it does affect the health of the plants if allowed to increase. They are able to provide conditions that favour healthy plants, which invariably “grow out” of the disease. The name describes the disease so clearly that it is at once recognised. It makes its appearance by a blister-like swelling, followed by a crack or split in the epidermis or skin of the leaf and stem, whence issues a brown sort of dust, which are the spores of a fungoid disease. (*See Fig. 15.*)

Rust will seldom break out if a dry, buoyant atmosphere is maintained; but it flourishes and spreads in damp or warm, moist conditions. We use one-hundredth part of methylated spirit diluted in water, and spray the solution on the plant; but we do not always find that the remedy (although methylated spirit undoubtedly checks the disease) sufficiently enters the affected parts to eradicate the trouble. Happily less known, but really far more deadly is

Carnation Spot.—This disease, with which fairy

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ring spot is closely allied in its ill effects, seems more prevalent in some districts than in others. In the moister climate of the West of England and in Ireland it is always more or less present in a wet autumn, which makes it advisable, if not imperative, to house plants for winter blooming in the early part of August, to avoid the heavy autumnal rains on both foliage and roots. The first warning makes itself apparent by spots resembling a burn from the rays of the sun, of a somewhat brown or grey colour, which gradually increase in size until they join together, causing the leaf to wither and die. From the leaf the affection passes to the stem until the whole plant is in the grip of the fungoid growth, which speedily kills it. As a preventive give the plants a dry atmosphere, and as a remedy pick off affected parts and dust the plants with a mixture of equal proportions of flowers of sulphur and air-slaked lime.

Stem Rot.—This disease is quite indiscriminate in its favours. I have seen it badly in the houses of market growers. Its appearance is made known by plants dying off for no apparent reason until they are examined, when it will be noticed that the name of the disease fully describes the cause of the mischief it does. A sort of rot sets in, usually at about the ground level; occasionally, however, only the upper portion or branch of the plant dies. I lay myself open to contradiction if I say there is no remedy for the second mentioned form of this evil, but I must confess that none is known to me. The fact is, we are not

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acquainted with the full nature of stem rot. We are always very careful not to place Carnations deeply in the pots, for this undoubtedly gives rise to the disease. If stem rot seems prevalent in the upper portion of young plants, dust with lime and sulphur in equal proportions as a preventive, and, of course, give special attention to ventilation that the atmosphere be kept as dry as possible.

A Little-known Disease.—The Greeks erected a statue, “To the Unknown God,” and I have often thought there was much logic in it. Well they knew that there were other powers than they understood and acknowledged, and so they placed it on record. When talking of Carnation diseases we are limited to those with which we are acquainted, and although I do not mean to say that the diseases of Carnations are numerous, yet had I been writing as recently as two years ago I could not have described so fully that which is recognised by discolouration of the leaf. Especially the tips of the young leaves appear yellow; often the epidermis of the leaf itself is discoloured in the same way. The reason is not known, but some attribute it to “burning” of the young and soft foliage by rays of the sun, which, however, is still another and independent weakness Carnations sometimes suffer from in spring. The former trouble is now known to be the result of puncture by *aphis* (green fly), or even thrips, and the result is as described. The appearance of the plant is spoilt, and the affected parts are often attacked by rust; the

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young growths fail to develop good buds and flowers, and are liable to come "blind." Plants badly affected in this way seldom thrive or pay to grow, and if the disease is badly developed they are best destroyed.

The "remedy" is prevention, by fumigation and syringing, as recommended for aphis and thrips.

CHAPTER XIII

BORDER CARNATIONS AND PINKS

I MUST confess I am no advocate of the cultivation of these, for Perpetuals grown as Border varieties give more flowers and have a longer flowering period. In my humble opinion—and on this point many people agree—the chief reason that Border Carnations should still be cultivated, is the extraordinary beauty of some of the varieties. Indeed, in the month of July they excel both Perpetuals and Malmaisons. But what a qualification—in the month of July! They bloom for a month, but only a month; yet with the same trouble flowers can be obtained during several months from Perpetuals. Not even in constitution does the average up-to-date so-called Border Carnation excel the Perpetual sorts. So many of the best things in Borders do not thrive well if treated purely as hardy plants and left in the open during winter. However, there are many lovers of these; hence this chapter on them.

Propagating Border Carnations.—It would almost seem superfluous to go into details on this subject; so many are already acquainted with the system of layering, which is undoubtedly the best means of increasing the plants. I would refer those who have not already attempted propagating to the

PERPETUAL CARNATIONS

description of layering as recommended for Malmaisons on pages 43 and 44. Layering should be carried out in July and, if wanted in pots, the "layers" are potted up as soon as well rooted, which should be within three or four weeks from the time of layering. A good plan is to stand the freshly potted young plants in frames, shade them, and sprinkle with water until they are established. They should be planted in the open border during autumn, but with some sorts in April; and as soon as the flower shoots are sufficiently long they should be secured to 1½-foot stakes, to ensure straight and perfect stems. Disbudding is not advocated in the case of Border Carnations, unless large or show blooms are required. The operation of layering may also be carried out in the flowering pots, should they be large enough.

Pests and Diseases.—The worst and most common form of pest is wire-worm in the soil. This is a great trouble in some localities, and has caused more disappointment to lovers of this plant than all the rest of Carnation enemies together. What is more aggravating than to find one's novelties destroyed by this pest? Revenge is sweet and almost sure if, immediately the plant shows signs of dying, a spade or trowel is used to lift the root, when the wire-worm can almost invariably be found near the root and stem of the plant. A good remedy is to dress the land heavily each winter with lime and soot and continually to hoe the soil.

BORDER CARNATIONS AND PINKS

To reduce the ravages of wireworms many resort to the practice of digging the soil over and keeping a sharp look-out for them, picking out all those that are seen.

Growing Border Carnations in pots, which many carry out for the sake of blooms of better quality, does not differ greatly from the cultivation of Malmaisons, except that fire heat need only be given in extremely cold weather.

The list of varieties of Border Carnations is an endless one, and I will not attempt to give even a few of the best. The list of colours embraces a wider range of shades than is found in either the Perpetual or Malmaison varieties.

In concluding these few lines on the Border Carnation I am conscious that I shall give offence to many lovers of this plant. They will not hear of their favourites taking a back seat. However, I am convinced that the future will confirm my assertions, that the best Carnations for border work will be found among the Perpetual Flowering varieties.

Pinks.—The Garden Pink and the Perpetual Flowering Pink are among the most valuable plants for the garden. In constitution they are quite hardy, and in habit of growth suitable for border cultivation. They are so fragrant that one quickly becomes enthusiastic over these flowers. Pinks are so useful for edging beds of Carnations or other herbaceous plants that they are universally employed for this purpose. The usual time to propagate is the end of

PERPETUAL CARNATIONS

June or early in July. The cuttings strike quite readily if placed in a shaded frame, preferably facing north, in a compost of sandy soil. The cuttings, or "pipings," as they are sometimes called, should be rooted within three or four weeks. They should not be put in so closely as cuttings of Perpetual Flowering Carnations, but about 4 inches apart, as they may then be left in this position to grow until September, when they should be planted in their permanent position.

While not attempting to give a list of varieties, I have been so impressed by the variety Gloriosa that I advise all to grow it.

Perpetual Flowering Pinks.—These are more a hope of the future than a possession of the present. There exists, however, a Pink of a perpetual flowering nature, and in Progress we have a plant with deep mauve-coloured flowers and real perpetual flowering habit which will probably be employed successfully in breeding a race of Perpetual Flowering Pinks that will flower throughout the summer. The treatment of the Perpetual Flowering Pink Progress does not differ from that of ordinary Pinks, but under glass this variety may be flowered in May.

A LIST OF DISCARDED VARIETIES OF PERPETUAL FLOWERING CARNATIONS

White.—Lady Bountiful, My Maryland, Norway, Queen Louise, White Lawson, Lilian Pond, Lieut. Peary, Gov. Woolcott, Mrs. Robt. Norman, Mrs. S. J. Brooks, The Belle.

Red.—G. H. Crane, Christmas Eve, Crusader, Robt. Craig, Andrew Carnegie, Elizabeth, Winter Cheer, Red Spot, America, Hon. Gladys Fellowes, Red Lawson, Flamingo, Cardinal, Adonis, Defiance, Victory.

Crimson.—Gov. Roosevelt, Harvard, Ruby, Gwladys, Crimson Glow, Daheim, Octoroon, The President.

Pink.—Pink Imperial, Aristocrat, Nelson Fisher, Mrs. T. W. Lawson, Alpine Glow, Gloriana, Madame Therese Franco, Mrs. Leopold de Rothschild, Royalty, Ethel Croker, Daybreak, Melody, Salmon Lawson, Fair Maid, Helen Goddard, Winona, Ethel Ward, Pink Patten, Floriana.

Fancy.—Mr. T. W. Omwake, Imperial, Eldorado, Golden Beauty, Golden Eagle, Sunbird, Dorothy Whitney, Neptune, Prosperity, Oriflamme, Aurora.

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